AATCC CONVENTION ISSUE

AMERICAN

DYESTUFF REPORTER

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VOLUME 41 NUMBER 21

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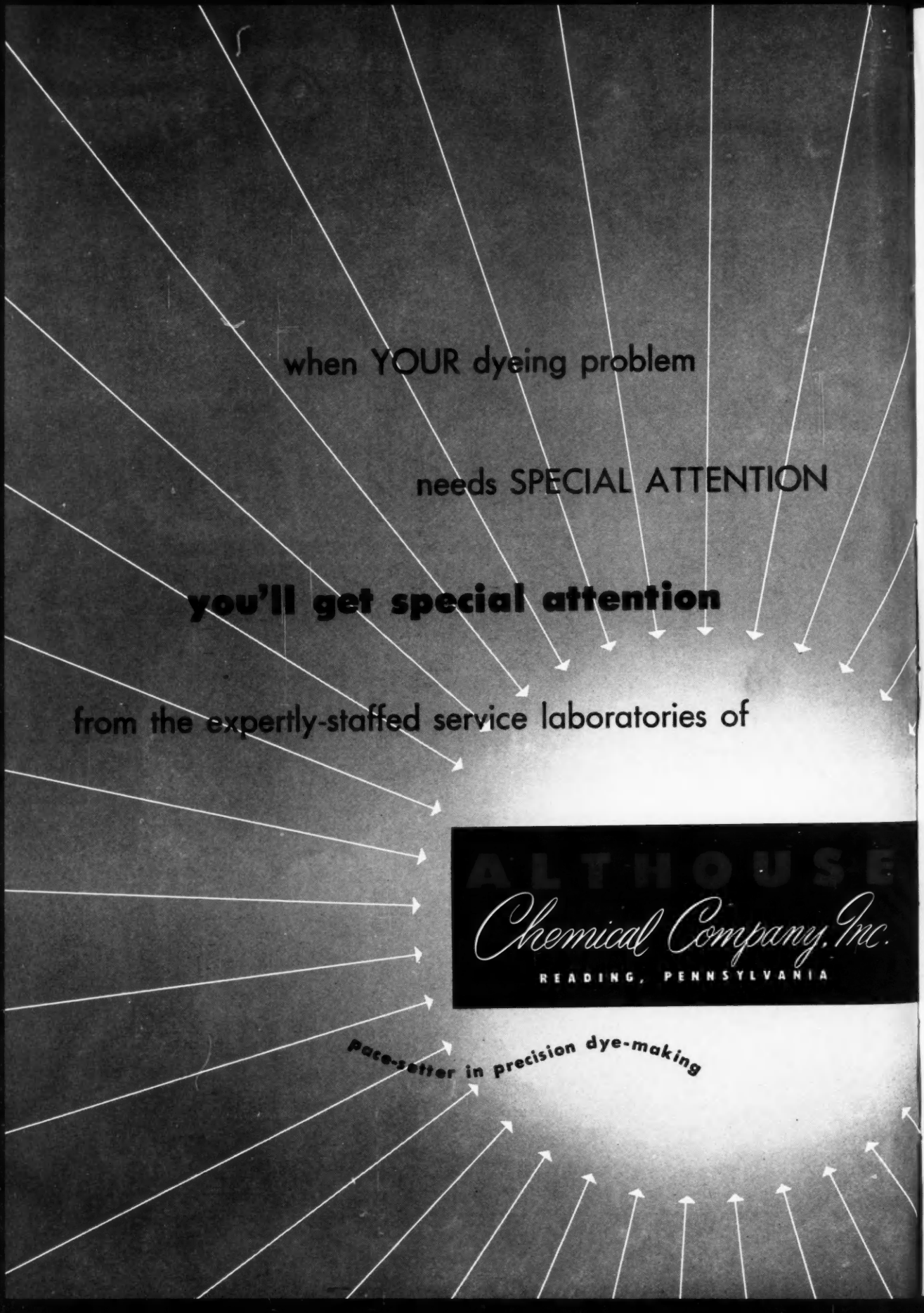

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Proceedings of the
American Association of Textile Chemists and Colorists
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Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

OCTOBER 13, 1952

1952 NATIONAL CONVENTION • HOTEL STATLER BOSTON • NOVEMBER 6-7-8

AN INVITATION FROM THE PRESIDENT

C NORRIS RABOLD
President
The Erwin Mills, Inc

THE PRESIDENT of the American Association of Textile Chemists and Colorists cordially invites you to attend the 31st Annual Meeting of the Association. This Meeting will be held in Boston, November 6th, 7th and 8th, 1952. There, we will be the guests of the Northern New England Section.

Many of the members of this year's Convention Committee, including the Chairman and Assistant Chairman, are the same individuals who made our Annual Meeting in 1946 such an outstanding success. The Committee has efficiently blended a combination of technical programs, exhibits, general meetings and entertainment so that each and every person attending this Meeting cannot help but find something appealing to his special interests and of specific value to him.

Our Annual Meeting provides a medium for the interchange of technical knowledge that cannot be equalled elsewhere. There will be in attendance at the meeting, leading scientists from all branches of the textile industry. Not only will our industry in this country be represented but we will also have visitors from Canada, England and the Continent, many of whom are world famed for their advanced thinking and scientific leadership.

Technical papers will be many, covering a wide range of subjects. We may expect to hear the latest theories on the dyeing and finishing of the newer synthetic fibers. Test methods for color evaluation and fastness will be discussed. Procedures for the bleaching, dyeing, printing and finishing of wool and cotton are still far from perfect, though they have been studied and improved for many years. New thoughts and new technological advances will be made available to us in this field. This broad coverage means that everyone will find something of value to him in his particular work, regardless of what it may be.

One of the opportunities afforded by our Annual Meeting is the personal contact and ensuing discussions between individuals. Everyone engaged in the wet-processing industry has something to contribute and much of the value in attending an Annual Meeting is through the interchange of ideas between people engaged in the same line of work.

Technical exhibits again will be an important part of the Meeting. The work of our Research Staff at Lowell and the work of our various General Research Committees will be a highlight of the exhibit. In addition, leading dye and chemical manufacturers, equipment makers and instrument and testing companies will present their latest developments for our inspection.

This will be the second year for the Student Contest. Our youngest members will bring to us papers that are of high caliber and interest. Another feature of the program will be the Intersectional Contest, which represents the work of volunteer research committees in each Section. These papers are always noteworthy for their value and immediate practical interest.

Through these words, I extend a hearty invitation to attend our 1952 Convention. Everyone, member and nonmember alike, will be welcomed.

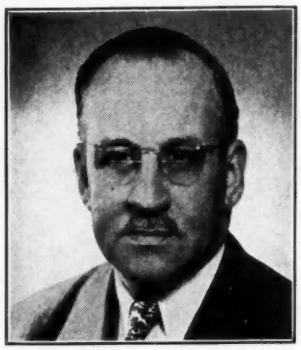
GREETINGS

FROM THE CONVENTION CHAIRMAN

WELCOME to Boston—the birthplace of our Association. The Northern New England Section and the whole New England region extends greetings to all members and friends of our Association. We are looking forward to seeing you at the Hotel Statler on November 6th, 7th, and 8th.

We hope you voted in the National Election before you came to Boston and that you will vote in favor of the program which we have prepared—technical, practical and social. We have deviated from the usual procedures in having the Olney Medal Award given at a special luncheon. The award for the Student Contest will also be given at a special luncheon. This gives our honored speaker and the President of our association full time at the annual dinner.

We have again (as last year), turned over the exhibits to the professional management of Campbell-Fairbanks, Inc. There will be fifty-four Exhibitors in over eighty booths, all on one floor, adjacent to our



GEORGE O LINBERG
Chairman

technical meeting place, the Grand Ballroom; our own AATCC Exhibit will be spotlighted in the center of the others.

Our technical papers, of the highest quality and interest, will be presented by well-known speakers. We open our technical program with the Student Contest and close with our Intersectional Prize Paper Contest in order to highlight those parts of the convention which are distinctively our own creation.

The program for the ladies will be most pleasant and the entertainment for all members will feature the world-famous Boston Pops Concert orchestra on Friday evening.

This is the first convention to be run fully under the control of the recently formed National Convention Committee.

We will have as guests the majority of the leaders of the textile industry of this region at our Annual Banquet, at which time William H Ruffin, our guest speaker and the first textile executive to hold the presidency of the National Association of Manufacturers, will be honored.

We extend to you a cordial greeting and a hearty welcome to your convention, along with the greetings from the city of Boston and from New England.

GEORGE O LINBERG
Chairman

GREETINGS

FROM THE CHAIRMAN, NORTHERN NEW ENGLAND SECTION

ONCE again it is the pleasure of the Northern New England Section to play host to the members of the American Association of Textile Chemists and Colorists at its birthplace in Boston.

We extend a most cordial invitation to each and every member of the AATCC to be here with us in Boston for the 1952 Annual Convention.

It is well for us to meet each year in National Convention, since it gives us an opportunity to re-evaluate our position as a national scientific body specializing in the field of textile chemistry. Our 1952 Convention Theme "AMERICA ADVANCES THROUGH CREATIVE CHEMISTRY" very appropriately indicates our national obligation and we are certain that the quality of our technical paper sessions will go a long way towards fulfilling at

C WENDALL LEVER
Chairman Ex-Officio

least a part of that obligation. The convention also affords time and a place where we may recognize and reward the outstanding efforts of some of our colleagues, many of whom have worked long and arduously in the interests of the Association and the textile industry.

Good old New England hospitality awaits you as well as several innovations that are strictly "Boston", all planned for your enjoyment. The ladies have not been overlooked in our planning and we are sure that the "Boston Convention of 1952" will long be remembered.

With best wishes until we meet in Boston.

C WENDALL LEVER
Chairman, Northern New England Section

1952 CONVENTION

Program

All Events at the Hotel Statler, Boston

Thursday, November 6, 1952

9:00 am—REGISTRATION—Mezzanine

9:30 am—NATIONAL COUNCIL MEETING—Parlors D and E

10:00 am—TEXTILE SCHOOLS' PRIZE PAPER CONTEST—Grand Ballroom, M M McCann, Chairman

2:00 pm to 5:00 pm—PERSONNEL SERVICE—Parlor E

2:00 pm—TECHNICAL SESSION—Grand Ballroom

"THE HUMAN SIDE OF TEXTILES"

Introductory Remarks—Edward R Schwarz, Textile Division, MIT

"Climate and Clothing from a Physiological Point of View"—L P Herrington, Department of Public Health, Yale University

"Sensation, Psychology and Science"—Walter J Hamburger, Fabric Research Laboratories, Inc, Boston

"Fashion's Foibles"—Sue Eastman, Glamour Magazine

(A ten minute discussion period will follow each paper)

8:15 pm—MOVIES—Grand Ballroom

Selected Short—"Quality Control in Modern Merchandising"

Feature Presentation—"The Man in the White Suit"

Friday, November 7, 1952

9:00 am—REGISTRATION

9:00 am to 12:00 m—PERSONNEL SERVICE—Parlor E

2:00 pm to 5:00 pm—PERSONNEL SERVICE—Parlor E

9:15 am—TECHNICAL SESSION—Grand Ballroom

"Methods of Producing Bonded Fiber Fabrics"—Howard E Shearer, American Viscose Corp.

"New Polymers for the Formation and Modification of Textile Fibers"—Herman F Mark, Polytechnic Institute of Brooklyn

"Philosophers' Toy to Industry's Headache: The Story of Static Electricity"—Sidney M Edelstein, Dexter Chemical Corp.

9:30 am—SYMPOSIUM ON STREAM POLLUTION—Bay State Room. Edmund A Leonard, Chairman

"Public Law 845, and the Co-operation between Federal Government and Industry"—Louis F Warrick, Federal Security Agency.

"In-Plant Process Control for the Reduction of Waste"—R Hobart Souther, Cone Mills Corporation.

"Activities of the Newly-Formed AATCC Committee"—Panel Discussion led by Edmund A Leonard, Chairman.

12:30 pm—OLNEY MEDAL AWARD LUNCHEON—Grand Ballroom

2:30 pm—TECHNICAL SESSION—Grand Ballroom

"Instrumental Control of the Dyeing of Carpet Stock"—John J Hanlon, Mohawk Carpet Mills, Inc.

"Application of Redox Potential Control to the Copper Method for Dyeing Acrylic Fibers"—R H Blaker, E I du Pont de Nemours & Co, Inc.

Panel Discussion: "Continuous Dyeing Methods (with special reference to Synthetics)", Robert D Robinson, Chairman, George L Royer, Calco Chemical Division, Discussion Leader.

8:30 pm—SYMPHONY CONCERT BY THE BOSTON POPS ORCHESTRA—Grand Ballroom

Saturday, November 8, 1952

9:00 pm to 12:00 m—PERSONNEL SERVICE—Parlor E

9:30 am—INTERSECTIONAL PRIZE PAPER CONTEST Grand Ballroom. Frank J O'Neil, Chairman

12:30 pm—TEXTILE SCHOOLS ALUMNI LUNCHEON Bay State Room

7:00 pm—ANNUAL BANQUET—Grand Ballroom

George O Linberg, Presiding.

Walter J Hamburger, Master of Ceremonies.

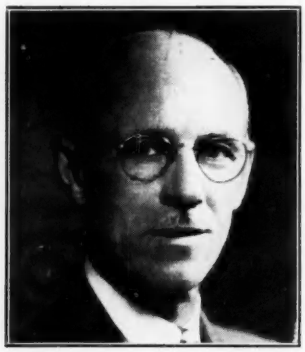
Intersectional Prize Paper Awards.

American Dyestuff Reporter Award.

President's Address—C Norris Rabold.

Guest Speaker—William H Ruffin, President, Erwin Mills, Inc, Durham, N C.

NATIONAL OFFICERS



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Ciba Company, Inc

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Vice President
Hellwig Dyeing Corp

SAMUEL L HAYES
Vice President
Ciba Company, Inc

RAYMOND W JACOBY
Vice President
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WILLIAM R MOORHOUSE
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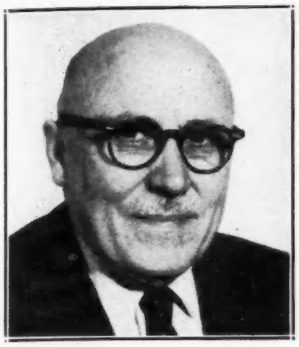
Allied Chemical & Dye Corp

ALBERT E SAMPSON
Assistant Treasurer
National Aniline Division
Allied Chemical & Dye Corp

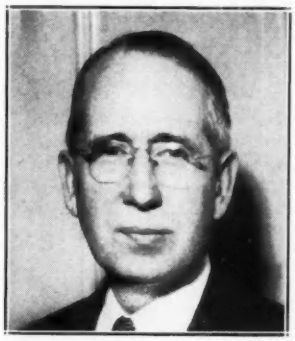
HAROLD W STIEGLER
Director of Research

CHARLES W DORN
Chairman
General Research Committee
J C Penney Co



LEONARD S LITTLE
Chairman
Executive Committee on Research
Consultant

GEORGE H SCHULER
Chairman
Publicity Committee
E I du Pont de Nemours & Co, Inc



KENNETH H BARNARD
Chairman
National Convention Committee
Calco Chemical Division

PERCIVAL THEEL
Chairman
Publications Committee
Philadelphia Textile Institute

GEORGE L BAXTER
Chairman
Corporate Membership Committee
Bradford Dyeing Association

ROGERS B FINCH
Chairman, National Technical Program Committee
Mass Inst of Technology

OUR CONVENTION THEME

Faith and The Future

They numbered originally — Two Hundred and Sixty-five.

Uncommon men, tempered by long years of experience in the dyeing and finishing of textiles, each member was chosen for his talent. They had in common only the Faith that they could create through Chemistry a greater Future in their expanding industry.

From the East, the North, the South and the West, they came. They found here a meeting place. Here in open covenant, they could discuss their problems. In the doing, they built with willing hands a dignified future for the Chemist, Colorist, Dyer, Finisher and those who serve the industry technically.

Thus, on October 15, 1921, poor in purse but rich in ideals, The American Association of Textile Chemists and Colorists came into being. It was born in the American heritage of free enterprise, free speech, and Faith in America's Future.

Thirty-one years have passed. What was a vision is now a reality. THEIR Faith in the Future has been rewarded.

Today we number Seven Thousand. Nationally and Internationally we are known and recognized as authority on textile matters.

Again from the East, the North, the South and the West, we come to refuel the lamps of Experience, Knowledge, and Goodfellowship. We come to give freely of ourselves that our industry and profession may prosper. We salute with respect and with fitting humility those Founders whose vision, courage, and ability to serve ABOVE SELF have made it possible that

AMERICA ADVANCES THROUGH CREATIVE CHEMISTRY

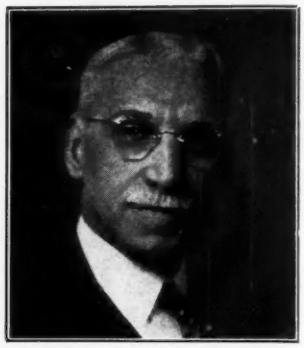
We honor those Two Hundred and Sixty-five. THEY kept THEIR Faith in the Future. THEY encouraged thousands of others.

Let US pledge ourselves to do likewise.

For: If we lose that Heritage we become poor indeed!

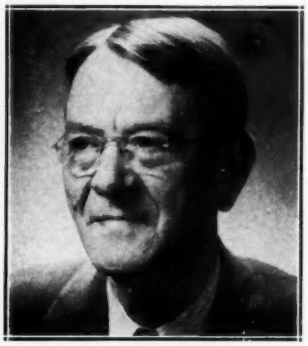
PAST PRESIDENTS

(An asterisk follows the names of the deceased)



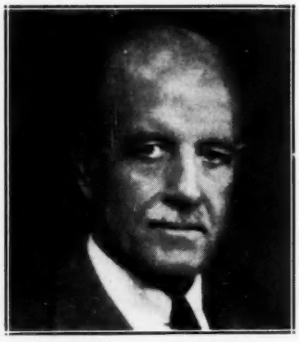
LOUIS A OLNEY* (Founder)
1922-1927

ELVIN H KILLHEFFER
1928-1930



P J WOOD
1931-1932

ROBERT E ROSE*
1933-1935

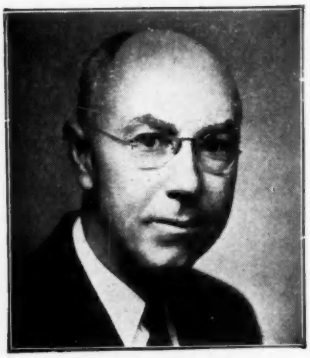


WILLIAM H. CADY
1936-1937

ALBAN EAVENSON
1938-1939

CARL Z DRAVES
1940-1941

THOMAS R SMITH
1942-1943



WILLIAM D APPEL
1944-1946

HENRY F HERRMANN
1947-1949

CONVENTION COMMITTEES . . .

NATIONAL

Convention

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Textile Resin Department,
American Cyanamid Company
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National Aniline Division,
Allied Chemical & Dye Corp
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J C Penney Co
Walter F Fancourt, III
W F Fancourt & Co
C Russell Gill
Southern Sizing Co
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Apponaug Division,
Aspinook Corp

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Massachusetts Institute of Technology
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American Cyanamid Company
Herman Boxser
Acadia Synthetic Products
Miles A Dahlen
Dyestuffs Division,
E I du Pont de Nemours & Co, Inc
Frederic Dannerth
Industrial Research Chemist
S Jack Davis
The Chemstrand Corp
Alden D Nute
Textile Resin Department,
American Cyanamid Company
W George Parks
University of Rhode Island
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Sumner H Williams
General Dyestuff Corp

STUDENT CONTEST COMMITTEE

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Student Contest

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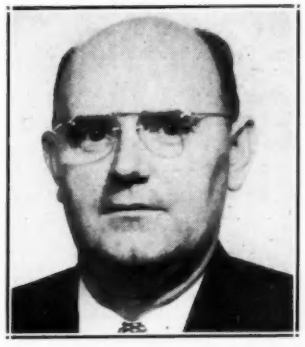
Herbert R Mauersberger
Fairleigh-Dickinson College
James L Taylor
Georgia Institute of Technology
Elmer E Fickett
Lowell Textile Institute
Francis Tripp
New Bedford Textile Institute
Henry A Rutherford
North Carolina State College



JAMES L TAYLOR

JOSEPH LINDSAY, JR

HERBERT R MAUERSBERGER

ELMER E FICKETT

FRANCIS TRIPP

Percival Theel
Philadelphia Textile Institute
Lester R Henry
Utica Technical Institute
James W Watters
Bradford Durfee Technical Institute

HENRY A RUTHERFORD

JAMES W WATTERS

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Synthron, Inc

Assistant Chairman

WALTER J HAMBURGER
Fabric Research Laboratories, Inc

Chairman Ex-Officio

C WENDALL LEVER
Deering, Milliken & Co, Inc

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Calco Chemical Division, American Cyanamid Company
Warren E Lincoln
Nyanza Color & Chemical Co
Henry M Pontefract
Hockmeyer Bros, Inc
Richard G Robertson
M T Stevens & Sons Co, Div of J P Stevens & Co, Inc.
Gerald F Quigley
Harold C Wood
Arnold, Hoffman & Co, Inc

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Howard I Belton
American Aniline Products, Inc
William F Brosnan
Esquire Processing Co
Lester C Conner
Bryant Chemical Corp
Frank L Kendall
Draper Bros Co

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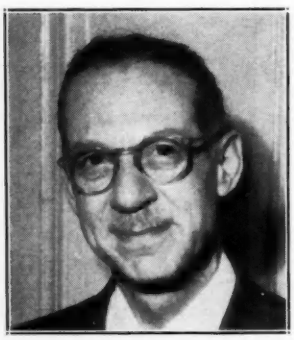
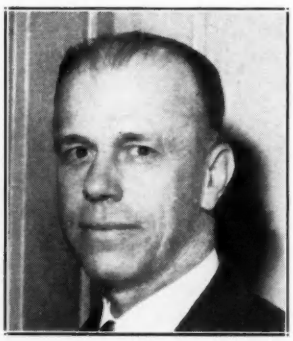
Pacific Mills
Benjamin F Pulsifer
Textron, Inc
Thomas W Shoesmith
Goodall-Sanford, Inc



WALTER J HAMBURGER
Assistant Chairman



J MILTON WASHBURN, JR
Chairman, Alumni Luncheon

JOSEPH A BRYANT, JR
Chairman, Dining

Exhibits

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Roland E Derby
The Derby Co, Inc
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E I du Pont de Nemours & Co, Inc
William W Pennock
E I du Pont de Nemours & Co, Inc
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Sandoz Chemical Works, Inc
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National Aniline Division, Allied Chemical & Dye Corp
John H Skinkle
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Sawyer F Sylvester
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Lyman Billings
William Whitman Co

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John F Sheehy

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Textile Consultant
Edwin A Buthmann
American Woolen Co
Henry D Evans
Pepperell Mfg Co
Elmer E Fickett
Lowell Textile Institute

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Chairman, Exhibits

HARRY M HARTNETT
Chairman, Hotel

MICHAEL E KEANE
Chairman, Publicity

AZEL W MACK
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Goodall Worsted Co
Henry D Grimes
American Woolen Co
Dexter R Kneeland
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Pacific Mills
Alex Morrison
American Woolen Co
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Weldon G Helmus
New York Section
Walter F Fancourt, III
Philadelphia Section
Arthur R Thompson
Richard H Tuttle
Piedmont Section
C Russell Gill
Southeastern Section
William S McNab
South Central Section
J D Mosheim
Alternate, South Central Section
Elliott Morrill
Mid-West Section
Norman G Koehler
Pacific Southwest Section

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Fairleigh Dickinson College
Frank J Clarke
Georgia Institute of Technology
Milton Boches
Lowell Textile Institute
Everett Charves
New Bedford Textile Institute
Thurston A Wilson, Jr
North Carolina State College
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Monsanto Chemical Co
Edmund A Leonard
Alexander Smith, Inc
W George Parks
University of Rhode Island
Richard D Wells
Bates Mfg Co

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Ladies

G NATHAN REED, *Chairman*
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Mrs Frank W Benvie
Mrs Harold C Chapin
Miss Marion Chapin
Mrs Philip S Durfee
Mrs Rogers B Finch
Mrs John M Gould
Mrs Walter J Hamburger
Mrs Ernest R Kaswell
Mrs Harry M Hartnett
Mrs Harold W Leitch
Mrs George O Linberg
Mrs Azel W Mack
Mrs William R Moorhouse
Mrs William W Pennock
Mrs G Nathan Reed
Miss Dorothea L Scheer
Mrs John H Skinkle
Mrs George Stewart
Mrs Harold W Stiegler
Mrs J Milton Washburn
Mrs G Adolph E Wessman
Mrs Walter H Zillessen

Registration

JOHN M GOULD, *Chairman*
Barre Wool Combing Co, Ltd
Edward B Bell
Textile Aniline & Chemical Co
William E Schmottlach
Goodall-Sanford, Inc
Walter H Zillessen
E I du Pont de Nemours & Co
Arthur F Brainerd
Western Area
John H Hennessey
Middle Atlantic Area
John B Neely
Southern Area

Transportation

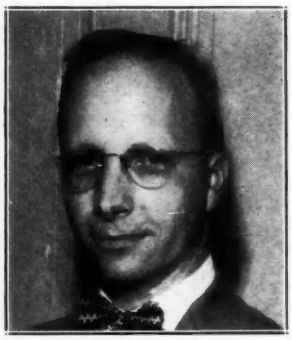
A FREDERICK BAGGESEN, *Chairman*
The Bell Co
Philip E MacLean
Onyx Oil & Chemical Co
Robert I Peirent
Lowell Textile Institute

Finance

PHILIP S DURFEE, *Chairman*
W C Durfee Co, Inc
John R Berwick
Sandoz Chemical Works, Inc
Harry I Emmons
American Woolen Company
John P Ploubides
Pacific Mills
Wilfred A Senechal
Goodall Sanford, Inc
Raymond J Schuster
Pacific Mills

EDWARD S CHAPIN
Chairman, Reception

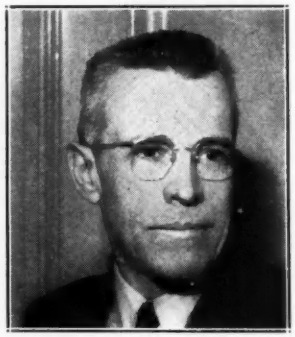
G NATHAN REED
Chairman, Ladies



A FREDERICK BAGGESEN
Chairman, Transportation

ERNEST R KASWELL
Chairman, Technical Program

JOHN M GOULD
Chairman, Registration



PHILIP S DURFEE
Chairman, Finance

Your Host——

THE NORTHERN NEW ENGLAND SECTION

HENRY D GRIMES

American Woolen Co

Formation Proposed December 9, 1921

AT THE Council meeting held in Boston, December 9, 1921, a petition was presented requesting the formation of a Boston Local Section.

The petition, which read as follows, was duly signed by forty-three active members of the Association:

"We, the undersigned charter members of the American Association of Textile Chemists and Colorists, desire to organize a Local Section in Boston, and hereby request the official approval of the Council as required by the Constitution of the Association.

"(Signed)

Leander F Conley	Winthrop C Durfee
Frank W Biery	Walter C Durfee
Thos J Beiry	Joseph E Travers
Walter W Carr	Amos K Hobby
John Everett	H R Davies
John M Hood	W B Butterworth
Frank E Kenyon	B C Bond
Leonard S Little	Robert E Fuller
Wilfred Lord	H E Gile
A McMillan	F A Keyzer
George A Moran	J L Barrington
Samuel Muirhead	W R Moorhouse
Chas L Parker	A K Gyzander
William Welpley	Andrew Fisher
William Woosnam	P S Crowell
Louis A Olney	John F Bannan
Arthur K Johnson	Simon P Kenny
Charles L Howarth	William Stoehrer
Fred V Hanson	Samuel A Stubbs
R B Clogston	Warren H Whitehill
Fred Riley	R C Smith"
Samuel J Nichol	

It was the pleasure of the Council to approve the foregoing application, and in accordance with Article XIII of the Constitution, the Council proceeded with the election of a secretary *pro tem*, Winthrop C Durfee being chosen in this capacity.

While this new Section was to be known as the Boston Local Section, the geographical boundaries of same embraced the entire area of New England with the exception of Rhode Island, the latter ground already being fully covered by the Rhode Island Section, with headquarters in Providence.

Henry D Grimes

Attention was called to the fact that in accordance with Article XV, members living in Connecticut or other adjacent localities could affiliate with the Rhode Island Section or a New York Section when formed, in case this proved more desirable.

Inaugural Meeting Organizes Section March 4, 1922

The inaugural meeting of this Section was held at the Engineers' Club in Boston on March 4, 1922 with about fifty members of the Association from Boston and vicinity in attendance.

This meeting was authorized by the Council after consideration of a petition for such Section received by them in accordance with the provisions of the Constitution and By-laws for the formation of local Sections. Winthrop C Durfee, who had been appointed Secretary *pro tem* by the Council and authorized to proceed with the organization of this Section, was in charge until after the election of officers had been completed.

The meeting opened with a dinner at 5:30, followed by the business session at 6:30 pm with Mr Durfee in the chair. After brief remarks by the Chairman, in which he outlined the business of the meeting, it was moved by Mr Moorhouse, and voted, that the Chair appoint a nominating committee who should present a list of names for officers for the ensuing year. This nominating committee, consisting of William D Livermore, Chairman; George A Moran, and Prof Louis A Olney, later recommended the following names for officers:

Chairman — Hugh Christison, Chemist, Arlington Mills, Lawrence, Mass.

Vice-Chairman — Miles R Moffat, Chemist, Amoskeag Mfg Co, Manchester, N H.

Secretary—Arthur K Johnson, Chemist, Lowell Textile School, Lowell, Mass.

Members of Executive Committee—John F Bannan, Chemist, M T Stevens & Sons Co, North Andover, Mass; Frank E Johnson, Dyer, Wood Mills, Lawrence, Mass; Leverett N Putnam, Dyer, Arlington Mills, Lawrence, Mass; Harry K Davies, I Levinstein & Co, Boston, Mass; Warren H Whitehill, Chemist, Brightwood Mfg Co, North Andover, Mass.

An election followed in which all mentioned above were unanimously chosen.

Upon the election of Mr Christison as Chairman, Mr Durfee relinquished the chair and the business was carried on in regular fashion with continued enthusiasm.

Among the items of business transacted were the following:

1. Selection of name of the Section.
2. Statement of season for holding meetings.
3. Number of meetings in year.
4. Place and time of meetings
5. Suggestions as to character of meetings.

Various names for the Section were proposed, such as "Eastern Mass", North Eastern", "Northern New England", and good discussion followed. Much interest was shown in the names North Eastern and Northern New England, and the latter was finally adopted by a large majority.

Charter Members in NNE Section Numbered 118

A list of the original membership of the NNE Section is not available but

it is possible to list the following charter members of the Association who because of their residence within the geographical limits of the Section at the time of its inception would automatically have made them the original members of the Section. There were 118 such, whose names we list herewith:

E W Adams
Tracy Adams
C Nelson Alderman
George W Aspinall
William P Atwood
Walter J Bailey
John F Bannan
James L Barrington
Stephen W Bastow
Albert Behm
Dr Ludwig Biach
Thomas J Biery
Frank W Biery
B C Bond
Arthur R Brown
G Winslow Brown
Louis F Bume
Fred E Busby
Wm Butterworth
Walter W Carr
Ed S Chapin
Hugh Christison
Alan A Claflin
Raymond B Clogston
Charles B Coan
Leander F Conley
Albert W Craig
J H Creaser
Prince S Crowell
Harry R Davies
Denis De Goenoz
Walter C Durfee
Winthrop C Durfee
John W Eich
John Everett
W H Fieldhouse
Andrew Fisher, Jr
Frank E Fleming
Robert E Fuller
Harold E Gile
Edward M Glennon
John H Grady
Henry D Grimes
A K Gyzander
Fred V Hanson
Ivan O Harlow
Walter F Haskell
J H Hindle
A E Hirst
Amos K Hobby
John M Hood
Russell W Hook
Charles L Howard
Arthur K Johnson
Arthur O Johnson
Ernest Johnson
Frank E Johnson
Simon P Kenny
Frank Kenyon
Frederick A Keyser
William A Kingman
Harold W Leitch
Leonard S Little
William D Livermore
William Lord
R S Lunt
Frank L McCool
James B Manning
Stephen N Mason
A McMillan
H A Mereness
Clarence Middleton
Arnold J Midwood
Miles R Moffatt
Claxton Monro
Wm R Moorhouse
George A Moran
Harry S Mork
Alex Morrison
Samuel Muirhead
Samuel Mungall
Wallace J Murray
George G Najar
John Douglas Newall
John Nichol
Samuel J Nichol
Prof Louis A Olney
William O Paisley
Charles L Parker
Tom Peel
George H Priest
Leverett N Putnam
James M Richardson
Fred Riley
Philip F Ripley
William K Robbins
Joseph W Russell
Wilfred Senior
Leon W Sidebottom
C G V Sjostrom
Russell Smith
J Verity Smith
Frederick Spencer
George Stewart
Charles H Stott
Samuel Stott
William Stoehrer
Henry J Thompson
Joseph E Travers
Ben Verity
Carl P Waldinger
Arthur H Webber
William Welpley
Warren H Whitehill
Frederick A Whitney
W S Williams
Isaac F Williamson
William Woosnam

Subsequent Meetings Included Discussions, Dinners and Outings

On April 22, 1922 the second meeting of the Section constituted the first technical meeting and set the pattern of technical papers and discussions which have distinguished these meetings down through the years.

The theme of the meeting centered around cloudy and shady goods. The following prepared papers were presented by members of the Section.

"The Causes of Shady and Cloudy Goods"—by Louis F Bume

"Shaded Goods"—by Thomas J Biery

"Some Experiences With Uneven Warp Dyeing"—by Walter F Haskell

"Some Causes of Shadiness and Cloudiness"—by Frank E Johnson

"Experiences With Shady Piece Goods"—by Leverett N Putnam

"Causes of Unevenness in Top Dyeing"—by Frederick Spencer

This turned into a general "experience" meeting with lively discussions.

Through the years technical papers have been presented at meetings of the Section, both by members and non-members, on a wide range of subjects directly connected with or indirectly related to the practical problems of the members. Most of these meetings have begun with a dinner, and general discussion has followed the presentation of papers. All of these events are matters of record in the AMERICAN DYESTUFF REPORTER.

There have been from four to six meetings each year during the 30 years of the history of the Section. While the most of these have been devoted to serious and valuable considerations of technical importance, it is of interest to note that there has been one well-attended outing each summer at which fun and fellowship reigned supreme and the cares of the technical world were entirely forgotten. As an example, we quote from the record of the 1931 outing:

"Golf and tennis on the breezy hillside produced ninety-eight good appetites and some sizzling bald heads. Golf prizes for members went to George Linberg for low gross of 82, to Gordon Thompson for low net, and to Phillips Graham for longest drive. Eric Goullaud was awarded a token of sympathy for gross of unmentionable dimensions".

Sectional Chairmen

Those who have served as Chairmen of the Section are as follows:

1922-24 Hugh Christison
1924-26 John F Bannan
1926-28 Harold W Leitch
1928-30 William H Cady
1930-32 Henry D Grimes
1932-34 Leverett N Putnam
1934-36 Roland E Derby
1936-38 Carl Z Draves
1938-40 Clarence L Nutting
1940-42 John N Dalton
1942-44 Edward S Chapin
1944-46 Delbert E Ray
1946-48 George O Linberg
1949-50 Frank J O'Neil
1951 Ralph E Hale
1951-52 C Wendall Lever

Sectional Secretaries

1922-28 Arthur K Johnson
1928-32 Harold C Chapin
1932-34 Clarence L Nutting
1934-40 John N Dalton
1940-42 Edward S Chapin
1942-52 Azel W Mack

National Officers

The following members of the Section have served as national officers:

President:
Louis A Olney

Chairman of Research Committee:
Louis A Olney

Vice-Presidents:
William D Livermore
William H Cady
Alex Morrison
Roland E Derby
Hugh Christison
John N Dalton
George O Linberg

Treasurers:
Winthrop C Durfee
Harry R Davis
William R Moorhouse

Secretaries:
Alex Morrison
H C Chapin

Annual Meetings

This year is the sixth time that the NNE Section has had the honor of entertaining a general meeting of the parent body at Boston. The list of these is as follows:

Nov 3, 1921—Inaugural Meeting, Engineers' Club

Dec 5, 1925—Fifth Annual Meeting, M I T
Chairman: We have been unable to determine definitely who was the chairman for this meeting.

Dec 4 & 5, 1931—Tenth Annual Meeting, Hotel Statler
Chairman: Harry R Davies

Sept 15, 1939 — Eighteenth Annual Meeting, Copley-Plaza Hotel
Chairman: W H Zillessen

Dec 12-14, 1946—Twenty-fifth Annual

(Concluded on Page P653)

TEXTILE DYEING AND FINISHING EXHIBIT
1952 NATIONAL CONVENTION
HOTEL STATLER, BOSTON

THERE will be 53 exhibitors occupying 84 booths for display of a wide range of dyestuffs, chemicals and auxiliaries, synthetic fibers and fabrics constructed from them, and laboratory and process equipment. This will be the largest exhibition of this type to be held in New England in many years.

The exhibition hours are: November 6 and 7, 10 am to 10 pm; November 8, 9:30 am to 12 noon.

Attendance is by convention registration. Student and plant groups with leader are, however, invited to attend on the two evenings and will not be required to register for the Convention or pay any fee; the leader will register once for his group.

There follows an alphabetical list of exhibitors with booth numbers and on succeeding pages are a diagram of the exhibit area and descriptions of the individual exhibits.

Firm	*Booth Number*
Alco Oil & Chemical	139-140
American Aniline Products, Inc	130-131
American Association of Textile Chemists and Colorists	A and B
American Bemberg Corp	108
American Conditioning Co	119
American Dyestuff Reporter	16
American Optical Co	135
America's Textile Reporter	132
Anderson Machine Shop, Inc	115
Atlas Electric Devices Co	136
Bersworth Chemical Co	27-28
Calco Chemical Division, American Cyanamid Company	104-105-106
Carbide and Carbon Chemicals Corp	31
Catalin Corp of America	110-111
Celanese Corp of America	4-5-6
Ciba Company, Inc	17-18
The Cravenette Co, USA	109
Custom Scientific Instruments, Inc	149
Dow Corning Corp	22-23
E F Drew & Co, Inc	19-20
E I du Pont de Nemours & Co, Inc, Organic Chemicals Dept	24-25-26
E I du Pont de Nemours & Co, Inc, Fibers Department	7-8-9
Emery Industries, Inc	10-11
Fairchild Publications	10-A
Gaston County Dyeing Machine Co	116
Geigy Company, Inc	14-15
General Dyestuff Corp	107
Hilton-Davis Chemical Co	113-114
E F Houghton & Co	137
Instrument Development Laboratories	103
Interchemical Corp	120
Kelco Co	144
Macbeth Corp	145
Monsanto Chemical Co	146-147-148
National Aniline Division, Allied Chemical & Dye Corp	100-101-102
National Milling & Chemical Co	122
National Starch Products, Inc	141-142
Nopco Chemical Co	125-126
North American Rayon Corp	108
Owens Corning Fiberglas Corp	133-134
Rohm & Haas Co	123-124
Royce Chemical Co	32-33
Sandoz Chemical Works, Inc	29-30
Seydell-Woolley Co	129
Socony Vacuum Oil Co, Inc	21
Tennessee-Eastman Corp	1-2-3
Textile Age, Inc	112
Textile Bulletin	121
Textile Industries	138
Textile World	117
Virginia-Carolina Chemical Co	143
Virginia Smelting Co	12-13
Wallerstein Company, Inc	127-128
Warwick Chemical Division, Sun Chemical Corp	118

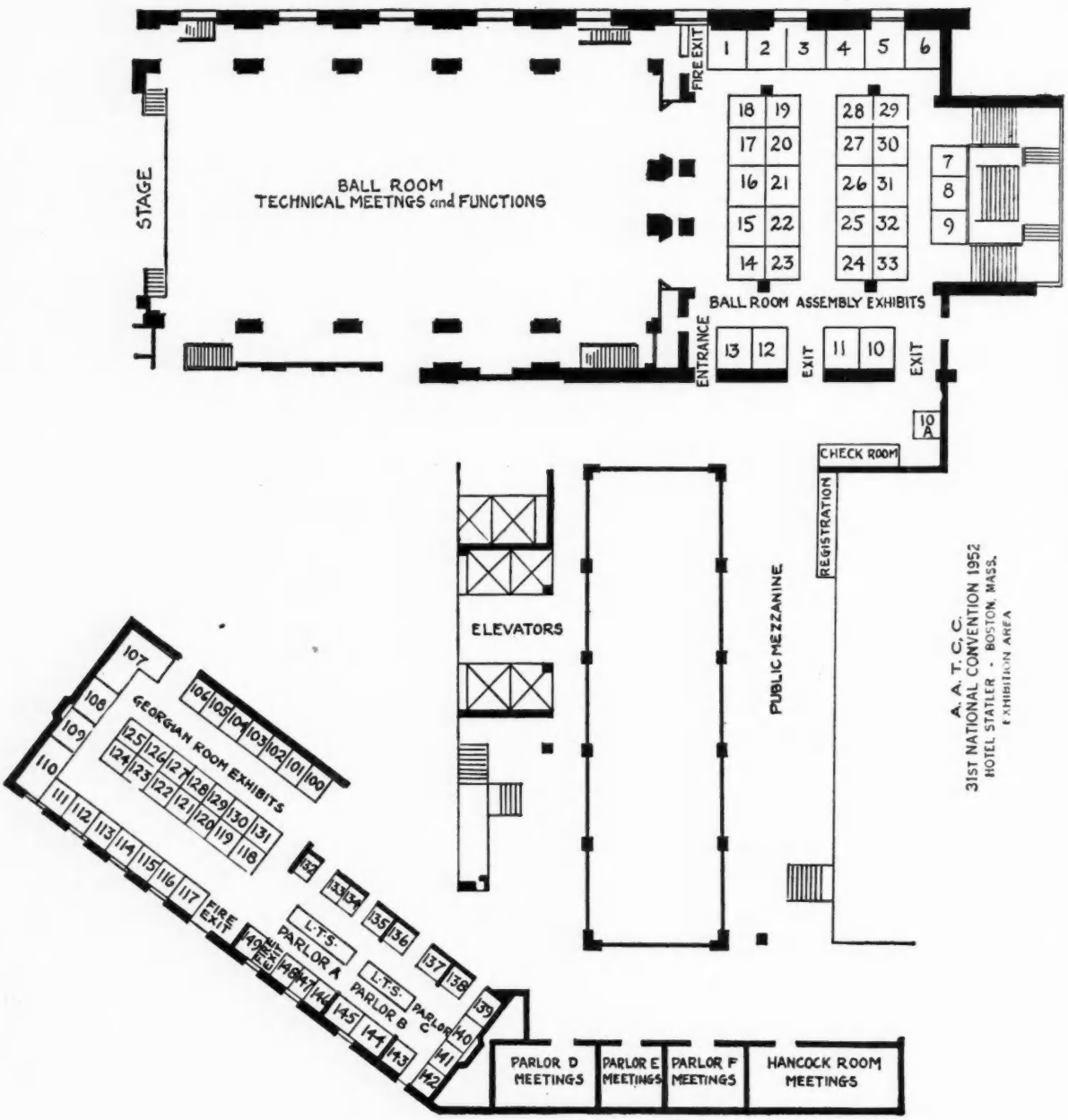


EXHIBIT AREA

Alco Oil and Chemical Corporation

Trenton Avenue & William Street
Philadelphia 34, Pa

Booths 139 and 140

Products to be shown include: Vulcanols—latex compounds for coating pile fabrics; Alcogums—sodium polyacrylate type thickeners; Vulcacures—latex compounding chemicals; and Foamtols—latex compounds for use in the manufacture of foam rubber.

Specially featured will be the Vulcacures, a new line of rubber chemicals developed in the past years especially for use in compounding latex.

In attendance: Arthur E Jones, Jr, Vice President; John W Jordan, Director of Sales; Donald W Robinson and F M Tolin, Sales Representatives; Dr O B Hager, Director of Research; and W N Moore, Chemist.

American Aniline Products, Inc

50 Union Square
New York 3, N Y

Booths 130 and 131

A complete line of dyestuffs and textile specialties will be exhibited. Several newly released specialties will be included in the exhibit.

In attendance: J J Marshall, Manager of Domestic Sales; J H Orr, Manager of Charlotte Branch; J T Bohannon, Manager of Chattanooga Branch; R W Brewer, Manager of Paterson Branch; E K Bush, Manager of Providence Branch; H I Belton, Manager of Boston Branch; and representatives of the sales and technical staffs of each branch.

American Association of Textile Chemists and Colorists

Lowell, Mass

Parlors A and B

These booths will contain various pieces of testing equipment as well as display charts illustrating results produced in the various testing procedures. Equipment on display will include: Fade-Ometer, Launder-Ometer, Accelerotor (accelerated abrasion—wet or dry), Flammability Tester, Fire Resistance Tester, Scorch Oven (chlorine retention), Gas Fading Test Chamber (effect of oxides of nitrogen on dyed acetate), Dry Cleaning Range (model), and Dynamic Dimensional Change Meter. The Accelerotor and the Dynamic Change Meter will be the most up-to-date models available and should include all 1952 improvements and modifications. Such of the Rapid Control Tests as have been perfected will be demonstrated and explained. Members of the various Research Committees will be on hand in the exhibit area to answer general questions, explain their particular problems, and describe the best available solutions.

In attendance: Dr H W Stiegler, Director of Research and several members of his staff.

American Bemberg Corp

261 Fifth Avenue
New York 1, N Y

Booth 108

To be shown will be rayon yarn—spun staple; regular filament; thick and thin—various colors and filaments; fabrics made of Bemberg rayon.

In attendance: James C Fortune, Advertising Merchandise Manager; William H Six, Fabric Development Department; and Ernest H Benzing, Chemical Research Technician.

American Dyestuff Reporter

44 East 23rd Street
New York 10, N Y

Booth 16

Copies of the official registration list of Convention attendants will be available.

In attendance: Myron D Reeser, Business Manager; Norman A Johnson, Editor; Herbert A Stauderman, Advertising Manager; and Charles A Whitehead, Managing Editor.

American Optical Company

Instrument Division
Buffalo 15, New York

Booth 135

A production model of the AO Rapid Scanning Spectrophotometer will be displayed. This is said to be the first kinetic spectrophotometer for the instantaneous display of the whole visible spectrum. It scans the spectrum in 1/180 of a second and repeats the scan 60 times per second, plotting the wave-length against percent transmittance or reflectance on the face of the cathode ray tube. It is stated that extremely rapid color changes are clearly visible and can be recorded by an oscilloscope camera. The instrument has great potential in the field of color analysis, color matching and control. It is compact and of such design that it can be moved from station to station within a plant. Other instruments on display will be the AO Spencer Phase Microscope and the P45 Polarizing Microscopes which have applications in the field of fiber identification. A low-power Stereoscopic Microscope, for fiber identification, producing three-dimensional images; a Refractometer for determination of refractive indices of liquids and solids; and a low cost photomicrographic camera with telescopic eyepieces for 4" x 5" plates and 2" x 2" Kodachromes, will also be shown.

In attendance: N J Blaiklock and R J Scott, Sales Representatives; W E Folland, Product Manager; and technical personnel.

America's Textile Reporter

286 Congress Street
Boston 10, Mass

Booth 132

Textile Publication.

Anderson Machine Shop, Inc

Brook Road
Needham Heights 94, Mass

Booth 115

The Pacific Evenness Tester will be shown to demonstrate quality control in the mill, research, and development of new textile machinery. The tester produces a graph showing the variation of any fibrous material, cotton, woolen, worsted blends and synthetics from 8 oz per 5 yards to 1/100s worsted count. The graph indicates the following: weight of material, average weight of any new measured length, average percentage of variation for any length, percentage of maximum deviation from the average mean weight of the material being tested, average amount that the material is heavier or lighter than the desired weight.

In attendance: James G Anderson, President; Angus G Anderson, Salesman; and Miss Rita Casby, Demonstrator.

Atlas Electric Devices Co, Inc

361 West Superior Street
Chicago 10, Ill

Booth 136

On display will be the Fade-Ometer and Launder-Ometer, the standard machines for lightfastness and washfastness testing. Also on display will be the new Scorch Tester for chlorine retention determination and the Accelerotor for washfastness and abrasion testing.

In attendance: John W Lane, President and J E Norton, Director of Research and Development.

Bersworth Chemical Company

Framingham, Mass

Booths 27 and 28

New additions to the family of chelation chemicals, sold under the general name of "Versenes", will be featured. Now available are specific chelating agents that can complex ferric ions and not calcium; others can chelate calcium, magnesium and ferric ions. Because the Versenes enter into so many phases of the textile industry, Bersworth will attempt to show what the chemistry of chelation can do for the industry. The new Bersworth trade-mark symbol of claw-in-circle animates the Versenes and points them out as the key to chelation. It is claimed that the Versenes have: prevented iron and lead sulfide stains on viscose fiber, promoted level dyeing, stopped reactions catalyzed by metallic ions, prevented iron stains on cotton from kier boiling, improved the color of cotton in continuous bleaching, increased the strippability of shoddy, eliminated the difficulty of iron in chrome and acid dyeing, improved the fastness properties of naphthol dyeing by an after-treatment, prevented harsh wiry fabrics when Orlon is yarn-dyed by after-scouring, and helped to produce a desirable hand on Dacron, Orlon and other synthetic fabrics by after-washing. The uses of Versenes will be emphasized by the use of illuminated transparencies, along with a technical display.

Calco Chemical Division

American Cyanamid Company
Bound Brook, N J

Booths 104, 105 and 106

On display will be Calco's line of fast dyes, with emphasis on required fastness properties for successful marketing of textile fabrics.

In attendance: Members of management of Calco Dyestuff Sales and Application Research Departments, field representatives of the Dyestuff Department and technical service personnel.

Carbide and Carbon Chemicals Company Textile Fibers Division A Division of Union Carbide and Carbon Corporation

30 East 42nd Street
New York 17, N Y

Booth 31

On display will be Dynel staple fiber and finished goods. Special features will include new colors, new finishes and new Dynel blended fabrics.

In attendance: R K Kennedy, F C King, H Carolan, T A Field and F Rippner.

Catalin Corporation of America

One Park Avenue
New York 16, N Y

Booths 110 and 111

This exhibit will be of an institutional nature. The background of the exhibit will pin point the various facilities, plants, distribution points and sales offices. The featured materials will be Catalin textile finishing resins.

In attendance: H Krehbiel, President; L L Beck, Vice President; V W Moss, Eastern Sales Manager; P A Krentel, Southern Sales Manager; R A Woodard, Sales Service Manager; and E S Horsman, S A Trezise and W T Bell, Sales.

Celanese Corporation of America

180 Madison Avenue
New York 16, N Y

Booths 4, 5 and 6

The exhibit will highlight the versatility of acetate fibers by themselves and in blends with other man-made and natural fibers. It will include fabrics that benefit directly from the use of acetate or are inspired by acetate. Apparel and drapery materials, as well as floor coverings, will be shown. The chemical section will be devoted to Celanese products used in wet processing of textiles.

In attendance: Dr A F Tesi, in charge of booth, Dr V S Salvin, Paul C Duggan, George Ward and B F Pimentel, of the technical staff.

Ciba Company, Inc

627 Greenwich Street
New York 14, N Y

Booths 17 and 18

This will be an institutional exhibit of Ciba vat dye and other dyestuff services to the dyestuff and textile industries.

In attendance: Raymond W Jacoby and Chester M Kopatch, Branch Managers; Haven A Morrison, Henry X de Redon, John V Geary, George L Wyatt, Arnold G Tew, John A Harley and Henry E Stanley, Jr, Salesmen; and Arthur F Rodenhaven, Technician.

The Cravenette Company, U S A

Eighth and Madison Streets
Hoboken, N J

Booth 109

To be shown will be durable and renewable water repellents for textiles as well as aluminum coating for linings and other fabrics.

In attendance: Charles Avery, Director of Research; Fred Barbaro, Sales Department; and Robert C Hunzinger, Vice President.

Custom Scientific Instruments, Inc

541-543 Devon Street
Arlington, N J

Booth 149

To be exhibited will be test instruments for textiles, including: C S I Stoll Quartermaster Universal Wear Tester, C S I Stoll Flex Tester and the S P I Flammability Tester. It is also hoped to display the Armstrong Indenter and to have folders on the Armstrong Abrader which are for use on semi-rigid and rigid sheet material. It is also hoped that a new test instrument will be announced.

In attendance: H J Bultman, Jr, Sales Manager.

Dow Corning Corporation

Midland, Mich

Booths 22 and 23

Four silicone products of special interest to the textile industry will be ex-

hibited: DeCetex 104, a durable water-repellent finish for synthetics and blends containing synthetics which is said to be gaining increased popularity among converters and finishers for its ease of application and resistance to hot water, detergents and dry cleaning solvents; Dow Corning (Class H) Electrical Insulation and silicone lubricants and greases which, it is stated, are the key to longer periods of high speed production at less cost; and Dow Corning Antifoam A Emulsion, a water-dilutable form of Antifoam A, which is being used to control foam in sizing solutions, dye baths, fabric printing inks, and other finishing preparations.

In attendance: F L Dennett, head of the Water Repellents Section, Product Development Laboratory and Bob Ford of his staff; Norton Foster, Philadelphia Technical Representative; J T Duane, Boston Technical Representative; R E Knopf, Atlanta Technical Representative; and C E Gibson, New York Technical Representative.

E F Drew & Co, Inc

15 East 26th Street
New York 10, N Y

Booths 19 and 20

This exhibit will show that the background of the company's textile chemical business is their large vegetable oil refinery at Boonton, N J, indicating the basic nature of their manufacturing process. Antistatic finishes, antistatic fiber lubricants, etc, will highlight the range of products offered to the industry for specific end uses.

In attendance: R H Bishop, Vice President, Sales; K W Hartmann, Vice President; Dr Geo Zinzalian, Sales Manager, Technical Products Division; J P Redston, Sales Manager, Textile Chemical Department; L W Davis, Technical Director; and D S Chamberlin, W G Paul, W H Kirkpatrick and C H Schaeffer, Sales.

E I du Pont de Nemours & Co, Inc Organic Chemicals Department

Wilmington 98, Del

Booths 24-26

This exhibit will feature important uses of the vat colors, recent developments in the dyeing of new synthetics, such as Orlon acrylic fiber and Dacron polyester fiber. Other developments in textile auxiliary and finishing materials will also be exhibited.

E I du Pont de Nemours & Co, Inc Fibers Department

Wilmington, Delaware

Booths 7, 8 and 9

Fibers and fabrics.

Emery Industries, Inc

Carew Tower
Cincinnati 2, O

Booths 10 and 11

Products to be exhibited will include Twitchell wool oils, Twitchell worsted oils, Twitchell Oils for Cotton Finishing, Twitchell Rayon Oils, a complete line of fatty acids and derivatives, and Plastolein plasticizers.

Important processing steps for various classes of fibers will be illustrated together with the major advantages of the respective Twitchell product and its influence at these points. The detailed story of new Twitchell 7421 Worsted Oil and the Twitchell Oils for Sanforized fabrics will also be displayed.

In attendance: R F Brown, chemical sales manager; V W Colby, assistant chemical sales manager; N A Ruston, director of development and service; W T Meinert, development and service; W H Shields, assistant research director; H T Buckley, senior chemist, textile research; J M Washburn, Jr, J W Ritz and W A Colby, district managers; J P Clancy, T L Reilling and F L Ekstrand, sales; A C Fusaro, advertising.

Fairchild Publications

7 East 12th Street
New York, N Y

Booth 10-A

Daily News Record and other publications.

Gaston County Dyeing Machine Co

Stanley, N C

Booth 116

This exhibit will consist of a laboratory dyeing machine suitable for both conventional and high-temperature dyeing complete with automatic controls and add dye and a five-pound, high-temperature, pressure laboratory unit of their rotary hosiery and knit garment machine.

In attendance: G H Hacker, Vice President and Sales Manager and G Lindner, Manager of the Export Department.

Geigy Company, Inc

89-91 Barclay Street
New York 8, N Y

Booths 14 and 15

Dyestuffs and Mitin durable mothproofing will be featured. Irgalan dyestuffs, a new range for wool, nylon and silk developed during the past year, will receive special emphasis.

In attendance: W H Turner and H A Keenan.

General Dyestuff Corporation

435 Hudson Street
New York 14, N Y

Booth 107

New dyeing equipment and fabrics will be exhibited. Specially featured will be new developments in dyeing with emphasis on the dyeing of the new man-made fibers. Samples of dyed fabrics with formulations will be on display as well as data on new dyestuffs and textile chemicals. There will also be animated representations of the Williams Continuous Stock Dyeing Machine and of the Marhen Process equipment.

In attendance: J R Bonnar, Technical Director; C A Bergeman, Technical Manager, Textile Chemicals; W R Brandt, Market Manager, Antara Products Division; P J Choquette, Research Coordinator; L S Thompson, In Charge of Mixed Fiber Department; Dr H E Hager, Assistant Technical Director; Dr H Lutringhaus, In Charge of Wool Department; D E Marnon, Staff Assistant; E Hansen, Coordinator, New Developments; H Hartnett, Salesman, Boston Office; and W Dewing, Branch Manager, Boston Office.

The Hilton Davis Chemical Co

2235 Langdon Farm Road
Cincinnati 13, O

Booths 113 and 114

Featured will be "Textile Dyestuffs for all 4"—i e, wool, cotton, silk, and synthetics. The back-drop of the booth will

be 3-sided and will revolve; one side will feature a display on wool colors; another side will show colors for synthetics and cotton; and the third side will display colors for silk. Each side will also depict the source of the fiber. The display on silk will include the entire life cycle of the silk worm and an exhibit of domestic moths which are also silk producing, but not on a commercial scale. Similarly, the cotton display will show live cotton plants in various stages of growth.

In attendance: Nelson S Knaggs, vice President in Charge of Sales; W Hersey Howard, Dyestuff Technical Sales; Arthur S Davis, Manager, Boston Office; P C Blackman, Jr, Partner, Blackman-Uhler Co (Southern Representative); W B Uhler, Partner, Blackman-Uhler Co; and E Roper, Dyestuff Technical Sales, Blackman-Uhler Co.

E F Houghton & Co

303 West Lehigh Avenue
Philadelphia 33, Pa

Booth 108

This display will feature detergents and wetting agents for textile wet processing; self-emulsifiable wool oils which reduce static; rayon oils and textile lubricants.

In attendance: C B Kinney, Manager, Textile Sales; O R Kerst, Sales Manager, Eastern Division-North; and O H McClay and H E Peterson, Textile Sales Representatives.

Instrument Development Laboratories, Inc

163 Highland Avenue
Needham Heights 94, Mass

Booth 103

Colorimetric measuring and control devices will be on display. Specially featured will be: the Universal Illuminator attachment for the Color-Eye which permits wide control of conditions of illumination and viewing; a tristimulus computer for coordinate conversion; an abridged spectrophotometer attachment for the Color-Eye; and the Colorede instrument for fully automatic process control though colorimetric methods.

In attendance: A R MacDonald, Sales Representative; George P Bentley, President; and Charles A Speas, Assistant to the President.

Interchemical Corporation

Textile Colors Division
Hawthorne, N J

Booth 120

Products to be shown include pigment colors for textile printing and dyeing, acetate dyes, stabilized azoic dyes, fast-to-light direct dyes, and metalized acid dyes. New products to be featured are Arigen Pastes (stabilized azoic dyes in emulsion form) and Arilite Dyes (fast-to-light direct dyes).

In attendance: Members of the Sales and Technical staffs.

Kelco Company

31 Nassau Street
New York 5, N Y

Booth 144

This exhibit will consist of a display of fabrics printed with Keltex.

In attendance: R O Davison, Eastern Division Manager; I L Blanchard and J J Sullivan, Sales Representatives; and F Habersberger and John Politi, Technical Service.

Macbeth Corporation

P O Box 950
Newburgh, N Y

Booth 145

On display will be the following equipment: Macbeth Super Color Skylight, Nickerson-Hunter Cotton Colorimeter, Macbeth-Ansco Color Densitometer with Rejector Head and Liquid Density Attachment, and Macbeth Laboratory and Industrial pH Meter.

In attendance: Norman Macbeth, President; Warren B Reese, General Sales Manager; and Paul A Celella, Sales Engineer.

Monsanto Chemical Company

St Louis 4, Mo

Booths 146, 147 and 148

This space will be used for a general presentation of all Monsanto textile chemicals.

In attendance: H Chandler Holmes, Advertising Manager, Phosphate Division; J E Crawford, Jr, Assistant Manager, Phosphate and Detergent Sales, Phosphate Division; Walter Campbell, Advertising Manager, Merrimac Division; and C L Jones, Jr, Assistant Manager of Sales, Merrimac Division.

National Aniline Division Allied Chemical & Dye Corp

40 Rector Street
New York 6, N Y

Booths 100, 101 and 102

A scene-in-action flow chart, "The Aniline Story" will be featured. Particularly timely because of National Aniline's recent announcement of a new plant at Moundsville, W Va, which will produce aniline by a new process, this diorama traces aniline through its intermediates to a wide range of end-products. Also to be exhibited is a display of unique weaves and prints by National Aniline customers, and an animated exposition of the use of Nacconol in wet processing of cotton, woolens, worsteds and synthetics.

In attendance: Albert E Sampson, Frank W Gainey, Michael E Keane, Thos F Tangney, John L Waldo, Edward J Allard, Richard Bayer, John E Hirn, Sr, John E Hirn, Jr, Francis L Toher, C C Knights, E W Camp, R Robertson, Wyss L Barker, O M Morgan, Paul Sullivan and W A Holst.

National Milling & Chemical Co.

4601 Nixon Street
Philadelphia 27, Pa

Booth 122

Soaps, detergents, and compounds for every textile need will be displayed.

In attendance: W Russell Harris and John J Tomalino.

National Starch Products, Inc

270 Madison Avenue
New York 16, N Y

Booths 141 and 142

Starches, dextrines, adhesives and resins will be the products featured in this exhibit.

In attendance: F Greenwall, President; J F Fitzgerald, Manager, Starch Sales; F W Bradley, Manager, Boston Office; and H C Olsen, I L Dowdee, J J Ducharme, E J Maslanka and W H Stone.

Nopco Chemical Company, Inc

1st and Essex Streets
Harrison, N J

Booths 125 and 126

Antistatic chemicals for natural and synthetic fibers as well as blends of these fibers will be shown.

In attendance: Emily A Taylor, Manager, Industrial Advertising Division (In Charge of Display); Walter B Morehouse, Manager, Textile Chemicals Division; L E Rossiter, New England District Sales Manager; Ralph Schaubhut, Chief Chemist, Textile Chemicals Division; and Arthur Waldron, New England Technical Sales Representative.

North American Rayon Corporation

See Description of American Bemberg Corporation booth.

Owens-Corning Fiberglas Corporation
Textile Products Division

16 East 56th St
New York 22, N Y

Booths 133-134

Exhibit of screen prints and roller print made of Fiberglas. Featuring roller prints.

In attendance: L H Ludeman, R J Lasko, Raymond Caroselli, John Wilson.

Rohm & Haas Company, Inc

222 West Washington Square
Philadelphia 5, Pa

Booths 123 and 124

This exhibit will contain information on Rohm & Haas' surface active agents (Triton X-100), nylon sizing materials (Acrysol A-1 and A-3), textile enzymes (Rhozyme LA, DX and PF).

In attendance: W H Thackston, manager of textile chemical sales; H F Travis, New England Manager; R G Thomas; R V Dugdale; W A Wardell; R G Lawrence; J M Schandler; T G Sloan.

Royce Chemical Company

Carlton Hill, N J

Booths 32 and 33

In this exhibit will be included the following products: Vatrolite, Discolite, Parolite, Dispersall, Neowet, Neozymes, Castrolites, Velvo Softeners, Velvoray and other textile chemicals.

In attendance: Howard C Royce, Vice President; Richard L Jones, Sales Manager; P J Wood, Technical Director; Arthur H Finley and William Brown, New England Representatives; and C W Holweger, Pennsylvania Representative.

Sandoz Chemical Works, Inc

61 Van Dam Street
New York 13, N Y

Booths 29 and 30

Will present a new line of dyestuffs at this exhibit.

In attendance: C H A Schmitt, R A Lindenmaier, Walter E Taylor, Herman L Schwarz, Frank J Casey, Alfred Carbone, Charles Saalfrank, Clifford Worthern and Henry Rollins.

Seydel-Woolley & Company

748 Rice Street, NW
Atlanta, Ga

Booth 129

Various wet processing chemicals, featuring the "Seyco" brand of finishing materials and textile auxiliaries, will be exhibited.

In attendance: Dr Paul V Seydel, Vice President; David Meriwether, Sales Manager, Finishes Division; and Carl R Blumenstein, Chief Chemist.

Socony Vacuum Oil Co, Inc

26 Broadway
New York 4, N Y

Booth 21

Industrial lubricants and petroleum process products.

Tennessee Eastman Company

Kingsport, Tenn

Booths 1, 2 and 3

This exhibit will accent the most recent developments in acetate color fastness. Included will be information regarding the "GLF" or "Estron" dye series, a complete range of Eastman Acetate Dyes said to possess excellent resistance to both gas and light, and the fastness properties of Chromspun, Eastman's made-in-color Estron acetate fiber. The use of these developments will be demonstrated in a number of typical fabrics.

In attendance: F L Bume, Chris Getsinger, Robert R Moore, Duncan Carmichael, George Wernz and George Hotte.

Textile Age, Inc

22 West Putnam Avenue
Greenwich, Conn

Booth 112

Textile publication.

Textile Bulletin

Charlotte 1, N C

Booth 121

Textile publication.

Textile Industries

806 Peachtree Street, NE
Atlanta, Ga

Booth 138

Textile publication.

Textile World

330 West 42nd Street
New York 18, N Y

Booth 117

Textile publication.

Virginia-Carolina Chemical Corporation

Richmond, Va

Booth 143

On display will be samples of Vicara in stock form, yarn form, and fabric form illustrating the wide variety of colors that can be obtained on Vicara without the use of special dyestuffs. This will be further illustrated by articles of apparel which utilized Vicara in blends with other fibers, both natural and synthetic.

In attendance: Carl C Mattmann, Textile Technologist; A G Koose and Randall

(Concluded on Page P653)

INTERSECTIONAL CONTEST

THE Intersectional Contest will, as usual, be an outstanding feature of the 1952 National Convention. The contest this year will mark the thirteenth time the event has been held. The first contest was held at the 1940 Convention in New York City and in commenting on it at a luncheon concluding the Convention held at the World's Fair on October 20th the late Dr Olney said in part:

"In planning for the Annual Meeting, the suggestion was made by Henry F Herrmann of the New York Section that some system be devised whereby each section, as such, present a paper in competition with similar papers presented by other sections for which a suitable prize would be awarded. The suggested plan of awarding prizes to Local Sections of the AATCC appeared to meet with the approval of all of the eight sections as well as individual members of the Association. The project was approved by the Council and in cooperation with Dr Walter M Scott, Chairman of the Technical Program Committee, was put into operation."

All of the eight sections presented papers in that year's contest and the winners were:

First—Rhode Island Section, "The Effect of Modern Finishing Agents on the Light Fastness of Cotton Colors"

Second—Southeastern Section, "Some Observations of the Tendering of Vat and Naphthol Dyed Army Duck on Total Exposure to Weathering"

Third—Philadelphia Section, "Variables Encountered in Fade-Ometer Testing".

Prize winners in subsequent Contests were as follows:

1941

First—New York Section, "Cotton Fabric Construction in Relation to Water Resistance"

Second—Philadelphia Section, "Testing Vat Dyed Cotton for Fastness to Hypochlorite Bleach"

Third—Southeastern Section, "Progress Report on the Preparation and Processing of Domestic Flax"

1942

First—New York Section, "Calibration of Fade-Ometers"

Second—Northern New England Section, "Evaluation of Light Fastness by Means of a Spectrophotometer"

Third—Philadelphia Section, "Value of Laboratory Tests in Predicting the Color Fastness Performance of Dyed Textiles"

1943

First—Philadelphia Section, "Minimum Chrome Required for Afterchrome Dyeing"

Second—Northern New England Section, "New Proposed Standards for Light Fastness"

Third—New York Section, "A Study of Textile Fibers and Fabric Constructions as Factors Influencing Adhesion of Textile Plastic Combinations"

1944

First—Rhode Island Section, "Factors Affecting Color Yield in Vat Color Printing"

Second—Northern New England Section, "The Effect of Shrinkage on the Physical Properties of Nylon"

Third—New York Section, "A Study of the Dimensional Changes in Rayon Fabrics"

1945

First—Rhode Island Section, "Factors Which Cause or Prevent Agglomeration of Pigment Particles"

Second—Northern New England Section, "The Mechanics of Zone Control in Resin Finishing"

Third—New York Section, "Evaluation of Fabrics as to their Flammability"

1946

First—New York Section, "Tippy Dyeing of Wool and its Control"

Second—Philadelphia Section, "The Effect of Dyestuffs on the Temperature Rise of Fabrics Exposed to Light"

Third—Rhode Island Section, "The Replacement of Starch in the Treatment of Textile Fibers and Fabrics"

1947

First—Northern New England Section, "An Electrolytic Method for Stripping Colored Wool"

Second—Philadelphia Section, "The Application of Chemical Controls to Acid Dyeing"

Third—New York Section, "Dyeing and Fastness Characteristics of Aqueous Chlorinated Wool"

1948

First—Piedmont Section, "Stability of Vat Colors at Elevated Temperatures"

Second—Northern New England Section, "A Spectrographic Study of Treated Textiles"

Third — Philadelphia Section, "Some Phases of High Temperature Dyeing"

1949

First—Rhode Island Section, "Acid Colloids of Resins"

Second—Northern New England Section, "Practical Tests for Quantitatively Evaluating Dye Characteristics and Dyeing Methods"

Third—Piedmont Section, "Dyeing Mixed Acetate and Viscose Fabrics with Vat Colors"

1950

First—Piedmont Section, "A Comparison of the Dyeing Characteristics and Related Properties of Rain-grown and Irrigated Cotton"

Second—Rhode Island Section, "The Continuous Dyeing of Nylon Fabrics"

Third—Philadelphia Section, "The Relating of Laboratory Exhaust Data on Mill Practice"

1951

First—New York Section, "The Measurement of Fabric Soiling"

Second—Rhode Island Section, "The Continuous Dyeing of New Synthetic Fibers"

Third—Philadelphia Section, "Some Variables in Improving the Crease Recovery of Cotton Fabrics with Synthetic Resins".

New York and Rhode Island are tied with four firsts each; in addition Rhode Island has had two seconds and one third and New York has had four thirds. If values of 5, 3 and 2 (the same ratio as used in awarding prize money) were assigned to first, second and third places, Rhode Island and New York would each have 28 points. Similarly Philadelphia would have 24, Northern New England, 23, Piedmont, 12, and Southeastern, 5.

The details on the 1952 Contest follow:

FRANK J O'NEIL
Chairman, National Committee

J ROBERT BONNAR
Member, National Committee

KENNETH A HOWRY
Member, National Committee

ALFRED J CARBONE
Judge, Northern New England

NATIONAL COMMITTEE

FRANK J O'NEIL, *Chairman*
Pacific Mills

J Robert Bonnar
General Dyestuff Corp

John M Gould
Barre Wool Combing Co, Ltd

Kenneth A Howry
Daily News Record

Earle D McLeod
Arnold, Hoffman & Co, Inc

Thomas R Smith
Wiscassett Mills Co

Jackson A Woodruff
American Viscose Corp

Chief Justice:

WILLIAM D APPEL
National Bureau of Standards

Judges Representing Sections:

Northern New England
Alfred J Carbone
Sandoz Chemical Works, Inc

Rhode Island:
Robert W Joerger
Franklin Process Co

Western New England:
Alfred N Henschel
Princeton Knitting Mills

New York:
Robert C Allison
Geigy Co, Inc

Philadelphia:
A C Nuessle
Rohm & Haas Co, Inc

Piedmont:
Sumner H Williams
General Dyestuff Corp

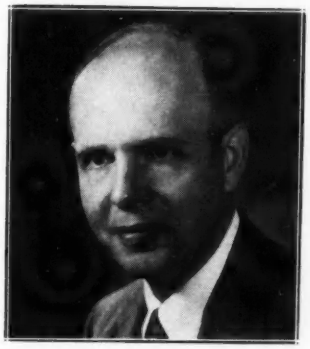
South Central:
William F Luther
Dixie Mercerizing Co

Southeastern:
H Gillespie Smith
Calco Chemical Division,
American Cyanamid Company

Mid-West:
A P Roy
Dean & Sherk Co

EARLE D McLEOD
Secretary, National Committee

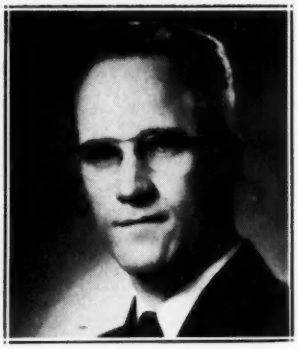
JACKSON A WOODRUFF
Member, National Committee



ALFRED N HENSCHEL
Judge, Western New England

ROBERT W JOERGER
Judge, Rhode Island

ROBERT C ALLISON
Judge, New York



A C NUESSLE
Judge, Philadelphia

SUMNER H WILLIAMS
Judge, Piedmont

WILLIAM F LUTHER
Judge, South Central

H G SMITH
Judge, Southeastern

A P ROY
Judge, Mid-West

SECTIONAL COMMITTEES

Rhode Island

RAYMOND B TAYLORSON, *Chairman*
General Dyestuff Corp

THORWALD LAKSON, *Cochairman*
Carbic Color & Chemical Co, Inc

RAYMOND B TAYLORSON
Chairman, Rhode Island

Edward J Allard
National Aniline Division, Allied Chemical & Dye Corp
G H Wood
Aspinook Corporation
Robert H Phillips
Cranston Print Works Co
George T Roberts
Greenville Finishing Co
Boris Frankfort
Glenlyon Print Works
Raymond W Jacoby
Ciba Company, Inc
Edward H Gamble
E I du Pont de Nemours & Co, Inc
W George Parks
University of Rhode Island
Alden D Nute
American Cyanamid Company
William H Cady
U S Finishing Co
Robert P Wood
Calco Chemical Division, American Cyanamid Company
James Pilkington
Riveredge Printers, Inc
Arthur Hustwit
Bradford Dyeing Association
William T Clarke
Arnold, Hoffman & Co, Inc
James R Redmond
Interchemical Corp

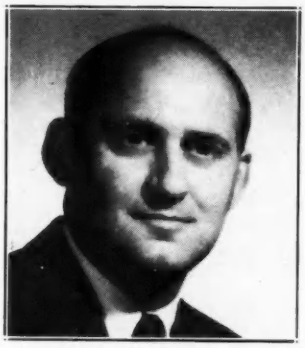
THORWALD W LARSON
Cochairman, Rhode Island

New York

HARRY MOORE, *Chairman*
Fair Lawn Finishing Co
Ormond W Clark
Calco Chemical Division, American Cyanamid Company
Charles Minoff
Texstyle Corp
Herman P Baumann
American Aniline Products, Inc
Lawrence S Thompson
General Dyestuff Corp
Paul Wengraf
Consultant

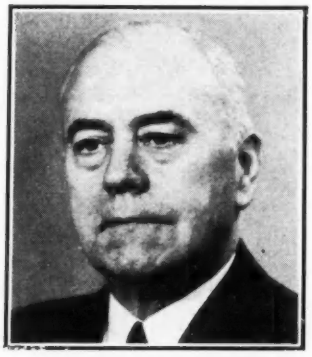
Philadelphia

MALCOLM J RIEDER, *Chairman*
Geo W Bollman & Co
N Abernathy
C T Anderson
Ciba Company, Inc
Jackson Bauer
Fred Whitaker Co
Bernard Baum
Sherwin-Williams Co
Joseph J Benischeck
Fred Whitaker Co, Inc
Bertram Blechman
Philadelphia Textile Institute
J R Brown
Lamar C Cloninger
Dow Chemical Co
James E Conway
Calco Chemical Division, American Cyanamid Company
Edward C Diehl
Ankokas Dyeing & Processing Co
F J De Maria
James Lees & Sons Co
Arthur W Etchells
Hellwig Dyeing Corp
D Fetcho
Richard W Foltz
Smith, Drum & Co
Thomas R Foltz, Jr
Philadelphia Textile Institute
Donald E Gamble
E I du Pont de Nemours & Co, Inc
George M Gantz
General Aniline & Film Corp
Robert F Graupner
Thomas H Hart
Hart Products Corp
Virgil T Hartquist
Jefferies Processors
R Hiester
Christian W Holweger, Jr
Royce Chemical Co
W T Jockers
Joseph F Kalina
Collins & Aikman Corp
Joseph W MacNeil
American Aniline Products, Inc
Constantin J Monego
Philadelphia Quartermaster Depot
Harry L Morgan
James Lees & Sons Co

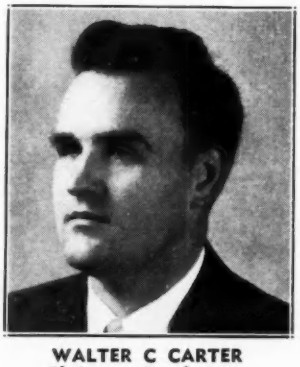


HARRY MOORE
Chairman, New York

M J RIEDER
Chairman, Philadelphia



DR HARLEY Y JENNINGS
Chairman, Piedmont



WALTER C CARTER
Chairman, Southeastern

Joseph J Murphy
Laurel Soap Mfg Co, Inc
Paul J Pernice
General Dyestuff Corp
Wayne Pheil
Jefferies Dyeing Works
Harry S Porter
Kali Mfg Co
H E Rollins
Milton Slone
Charles W Berg Laboratories
William S Sollenberger
American Viscose Corp
Richard B Stehle
Allegheny Dye Works
Albert E Stutzke
Globe Dye Works Co
Percival Theel
Philadelphia Textile Institute
Frederick V Traut
Globe Dye Works Co
R Stewart Wilkinson
Ciba Co, Inc
Jackson A Woodruff
American Viscose Corp
George G Wunsch
North American Lace Co
Joshua B Monego
Hart & Foster

Piedmont

HARLEY Y JENNINGS, *Chairman*
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Robert A Bruce
Amalgamated Chemical Corp
Francis K Burr
Burlington Mills Corp
Kenneth S Campbell
North Carolina State College
Clarence Hooper
Burlington Mills Corp.
Joseph C King
Fairforest Co
Russell G Lawrence
Rohm & Haas Co
Neal A Truslow
U S Rubber Co
Joseph Lindsay, Jr
Clemson College
M M McCann
Warwick Chemical Co
John B Neely
Burlington Mills Corp
Linton C Reynolds
Riegel Development Labs, Inc
Henry A Rutherford
North Carolina State College
Fred W Sturtevant
Fieldcrest Mills
R Hobart Souther
Cone Mills Corp

Southeastern

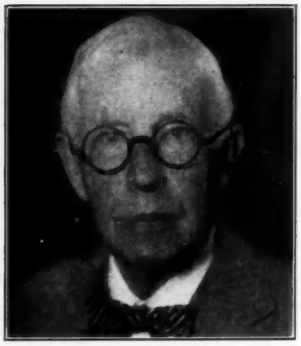
WALTER C CARTER, *Chairman*
Georgia Institute of Technology
C Russell Gill
Southern Sizing Co
J M Newton

Mid-West

MERRILL G MORRIS, *Chairman*
National Aniline Division,
Allied Chemical & Dye Corp

Western New England

OSCAR EDELSTEIN, *Chairman*
The Pond Lily Co



Alan A Claflin
Chairman, Northern New England

Northern New England

ALAN A CLAFLIN, *Chairman and Speaker*
Claflin-Dorman Co
John L Patti
Watson-Park Co
Kenneth L Dorman
Claflin-Dorman Co
Arthur F Gallagher, Jr
Hayward Schuster Woolen Mills, Inc

ABSTRACTS
OF INTERSECTIONAL CONTEST PAPERS

Printing of Acrylic and Polyester Fibers

RHODE ISLAND SECTION

THE objectives of this investigation were to determine if any of the conventional methods of printing would be applicable to acrylic fiber (Orlon) and polyester fiber (Dacron) and to develop new printing methods. Several approaches were considered:

1. Preparation of fabrics
2. Conventional printing procedures
3. Pretreatment of fabrics
4. Use of printing assistants
5. Heat treatment for development and/or fixation of dye
6. Steaming for prolonged periods at normal and/or at elevated temperatures
7. Effect of various binders
8. Aftertreatments to improve dye fastness

The application of the following classes of dyes was studied:

a. Acetate dyes
b. Acid dyes
c. Premetallized acid dyes
d. Vat dyes
e. Leuco esters
f. Direct dyes
g. Chrome dyes
h. Azoic dyes
i. Resin bonded pigments

This study included the influence of heat in aging, pressure steaming, and dry heat.

Preliminary experiments showed promising results with vat dyes, leuco esters and resin bonded pigments. Therefore, most of the subsequent work was devoted to these classes of dyes.

As this study progressed, the following aspects were investigated:

1. The theory that a solid solution could be attained at or near the softening point of the fibers.
2. The oxidation of leuco esters of vat dyes at elevated temperatures without chemical assistants.
3. Effect of thickeners.
4. The optimum time and temperature of heat treatment.
5. The variation of crock resistance with treatment.

Plant trials were made by the following methods:

1. Four vat dyes were printed as pigments in ethyl cellulose emulsion.
2. The same vat dyes were printed as vat acids in ethyl cellulose emulsion.
3. The leuco esters derived from these vat dyes were printed in ethyl cellulose emulsion.
4. Four resin bonded pigments were printed with a special emulsion.

It was found that resin bonded pigments and selected vat dyestuffs as pigments, as vat acids, and as leuco esters could be utilized for the practical printing of fabrics composed of Orlon or Dacron.

The Stripping of Color from Hydrophobic Fibers

PHILADELPHIA SECTION

THE removal of color from dyed textile materials is an unfortunate necessity that the dyer is often called upon to meet. His task is doubly hard when the textile materials he has to work with do not wet readily or associate with water.

This paper deals with a series of experiments investigating the stripping of color from textiles made from such hydrophobic fibers as nylon, acetate, Orlon, Dacron, Acrilan, Dynel, X-51, and Saran.

The stripping procedures followed are described and the results are evaluated from the following standpoint:

1. Amount of color removed.
2. Effect of stripping procedure on redyeing.
3. Effect of stripping in tensile strength.
4. Effect of stripping on light fastness.

Factors Influencing Dye Fixation on Padded Rayons

NEW YORK SECTION

IN a former paper, the New York Section made a preliminary study of some of the variables affecting pickup in padding. The results that committee reported can be considered important to an understanding of pickup performance of water of dye liquor, but their data offers no clue to diffusion and fixation of direct dyes in padding.

Their study is continued in this paper, but concentration is placed on the factors affecting fixation of direct dyes in padding.

After a thorough investigation of pertinent literature references, both American and British, the following variables were chosen as the basis of study:

1. Influence of pretreatment of cloth.
2. Influence of temperature of padding.
3. Influence of treatment of cloth after padding, particularly the effect of time of lay-up before drying.
4. Influence of temperature of drying.
5. Influence of dyestuff classes.
6. Influence of additions to padding liquor.

Much time was given to the study of all the variables and great effort was made to determine a method whose results would most closely approach the fastness obtained in conventional dyeing.

Both the laboratory and practical plant equipment were used to conduct the experiments.

The Effect of Conditioning on Crease Recovery Angle

PIEDMONT SECTION

IN the course of a study by the Piedmont Section on the use of catalysts with thermo-setting resins, an unusual phenomenon was observed. It was found that the addition of the usual amount of crease proofing resin produced no improvement on an all-viscose shirting fabric. This was not particularly surprising in view of the fact that the untreated fabric had a comparatively high crease recovery angle before treatment. On the other hand, it did provoke some curiosity as to why this untreated fabric had such apparently high performance characteristics.

It was decided to subject this fabric to the same steps used in the process of applying thermo-setting resin, but using water only in the treating bath. Fabric so treated when subjected to the standard test for crease recovery angle now exhibited very poor crease resistance properties, somewhat along the line that would be expected for this type construction.

It was therefore believed that the only difference between this so-called "water blank" and the previously untreated fabric was a matter of long-time conditioning. The water blank was given an extended conditioning over a period of thirty to sixty days, and at the end of two months it had regained its crease resistance properties as noted in the first discovery.

At the same time, it was noted that the resin-treated fabric, while showing no great improvement over the conditioned untreated fabric in the initial testing, showed considerable improvement, also with extended conditioning over a thirty- to sixty-day period.

The Section's paper contains data which exposes this phenomenon in a somewhat quantitative way on 100% viscose treated and untreated fabrics as well as cotton. The paper does not seek to completely explain this phenomenon, nor to make concrete recommendations as to the proper procedure for measuring fabric performance. It does suggest some viewpoints on the cause and some recommendations for further study in an effort to promote better understanding of the crease resistance treatment of textiles.

A Study of New Techniques in Warp-Size Preparation

SOUTHEASTERN SECTION

AN investigation of warp sizing practices has been long overdue. The trend to the elimination of batch kettle cooking methods in favor of machine processing has brought this phase of textile wet processing into the position which makes possible a more technical approach.

This study involves a laboratory investigation of unmodified rice, potato, wheat, sage, tapioca, and corn starches with respect to paste behavior during the cooking cycle and the effect of high pressure homogenization on paste viscosities.

It is generally recognized that one of the variables which introduces deviations from a desired added size content in the slashing operation is the degree of viscosity stability which the size attains when the mixes are prepared in advance and stored prior to application. It is for this reason that size mix viscosities and stabilities are herein investigated. The scope of this paper is confined to starch base size mixes normally applied to cotton and some of the synthetic staple warp yarns.

The cooperation of several representative mills in the southeast made possible a survey of actual processing methods. The size mixes prepared in these mills were tested for resulting viscosities and viscosity stability. In these instances, mill practice included the use of the Girdler Corporation's Votator, Gaulin Homogenizers, and the Scott and Williams Hydropulse. The addition of sizing auxiliaries other than starch was recognized, and the effect of warp lubricant addition on the resulting hot paste viscosities was considered constant by reason of ingredient analysis and amounts used.

Apparent viscosities of the laboratory- and mill-prepared hot pastes were obtained with the following instruments: the Brabender Amylograph, the Ultra-Viscoson, the Brookfield Synchro-Lectric viscometer, the Norcross viscometer, and a pipette type viscometer.

The test results are presented in the form of cooking cycle curves for the starches investigated, viscosity data at varying pressures of homogenization, procedures employed by the mills in their warp size preparation, and comparative viscosity data obtained from the mill practices encountered.

Textile Odors and Deodorants

NORTHERN NEW ENGLAND SECTION

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NNE Section——

(Concluded from Page P640)

Meeting, Hotel Statler
Chairman: George O Linberg

Nov 6-8, 1952 — Thirty-first Annual Meeting, Hotel Statler
Chairman: George O Linberg

The Silver Jubilee observance of the founding of the Association was quite fittingly celebrated in Boston, where the organization was first established. During 1921 the early meetings had been held at the Engineers' Club opposite Boston's famed and beautiful Public Gardens, at the foot of Commonwealth Avenue. These were culminated by the meeting at that location on November 3, 1921, which perfected and completed the organic structure of the association.

Twenty-five years later, meeting again, at Boston's Hotel Statler, the tremendous growth of the association was reviewed. It was evident that the founders and charter members had built better than they had anticipated even in their fondest and wildest dreams.

In terms of numbers of members, prestige, leadership in the textile industry, technical progress, establishment of standard procedures, and in terms of national and international usefulness, we had more than justified the original purposes of the founders.

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Exhibits——

(Concluded from Page P647)

Hagner, Textile Sales Representatives; William E Backus, Technical Service Representative; Frederick L Young, Dyeing Consultant; John H Karrh, General Manager, Fiber Division; and Jesse F Yeates, Jr, Sales Manager.

Virginia Smelting Co

West Norfolk, Va

Booths 12 and 13

This exhibit will feature two of Virginia Smelting's textile chemicals—sulfur dioxide and sodium hydrosulfite.

As a special attraction Gene Sarazen, famous golf professional, will present a novelty golf demonstration.

In attendance: W F Luckenbach, Jr, sales manager, Industrial Department; R H Isreal, advertising manager; T T Allan, New England representative; E H Keys and J R Eldridge, New York representatives; J B Johnson, Southern representative; H B Peterson, Southeastern representative; J G Todd, technical service.

Wallerstein Company, Inc

180 Madison Avenue
New York 16, N Y

Booths 127 and 128

On display will be a diagram of a continuous desizing range.

In attendance: J Andrew Clark, Sales Manager; and James J Casserly, John C Robertson and Frank A Taberski, Salesmen.

Abstracts of Technical Papers

Climate and Clothing from a Physiological Point of View

L P HERRINGTON

An illustrated discussion of the properties of man as a heat machine and his range of adaptation to climatic stresses of heat, cold, radiation, and moisture. The recent quantification of these stresses by physiologists and biophysicists resulting in the stress classification of various climates and the development of such concepts as the "clo" and "tog" units of clothing insulation is described. With this background, the bearing of more familiar physical characteristics of fabrics such as weight, permeability, and hygroscopic character is discussed in relation to the broad problem of adapting clothing to meet the physiological and comfort requirements of both general and special conditions of climatic use.

DR L P HERRINGTON

Dr L P Herrington is an environmental physiologist, concerned with the effect of heat, light, sound, vibration, and other physical agents on human health and performance. He is a graduate of Stanford University with the degrees of AB, AM, and PhD. In post-doctorate years he studied under a Rockefeller Fellowship at the Charité Hospital and University of Berlin, and held university appointments at Stanford University, the University of Illinois, and Yale University. Currently, he is Director of Research of the John B Pierce Foundation Laboratory of Hygiene in New Haven, and professorial lecturer in Environmental Physiology in the Department of Public Health at Yale University. He is the author or co-author of some seventy publications, including research studies, books, and monographs in the general fields of human calorimetry, climatology, and environmental physiology. With C E A Winslow, he is co-author of a recent book, "Temperature and Human Life", which reports the experimental basis of his views on bioclimatic factors and the effects of clothing and habitation in reducing climatic stress. In national scientific activities he is a member of the Research and Development Board Panels on Physiology and on Human Engineering and Psychophysiology, and is Chairman of the National Research Council's Quartermaster Executive Committee on Stress Physiology.

Methods of Producing Bonded Fiber Fabrics

HOWARD E SHEARER

It is shown that bonded fibrous web materials, which have now become well established under the name of non-woven fabrics, may be varied in their composition and structure to give a range of physical characteristics comparable to that obtained in woven fabrics. These features are obtained through many novel arrangements of existing textile equipment as well as newly developed machines especially for this use, which in a continuous process convert the raw fiber into finished fabric. Equipment for carrying out these operations by various means is diagrammatically illustrated and described by the author in relation to its use with fibers of different description, bonding media and product features.

HOWARD E SHEARER

Graduated from George Washington University and National University Law School, Washington, D C, with the degree of B S in Engineering and Doctor of Juridicial Science, Mr Shearer was for fourteen years a research associate for the National Association of Hosiery Manufacturers at the National Bureau of Standards. For the past ten years, he has been in charge of the Industrial Division of the Textile Research Department of the American Viscose Corporation at Marcus Hook, Penna. Through his present position he has been intimately associated with the development of the Bonded Fiber Fabrics Industry.

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New Polymers for the Formation and Modification of Textile Fibers

HERMAN F MARK

The synthesis and properties of new polymers and copolymers are discussed. Special attention is given to so-called "block" and "graft" copolymers, which contain the individual monomeric constituents in long stretches and which seem to have a number of interesting properties.

HERMAN F MARK

Herman F Mark received his Ph D summa cum laude at the University of Vienna, where immediately afterwards he joined the Faserstoff Institute in Berlin as a Research Fellow and later became group and department leader, which position he held until 1925. In 1926, he joined the staff of the I G Farbenindustrie in Ludwigshafen as a research chemist and became research director in 1928. In 1932, he was appointed professor of chemistry at the University of Vienna where he remained until 1938. After the invasion of Austria, he was dismissed and left Europe in 1938 to become research manager of the Canadian International Paper Company in Hawkesbury, Ontario. In 1940, he was appointed professor of organic chemistry at the Polytechnic Institute of Brooklyn and in 1945, was made director of the Institute of Polymer Research, which position he now holds.

Dr Mark is the author of several books and papers in the high polymer field. His principle research has been in the field of X-rays and electrons, and their use in studying the structure of matter in the preparation, degradation, characterization and modification of macromolecules, such as cellulose, rubber, polystyrene, and other natural and synthetic high polymers. Dr Mark received the Honorary Doctor of Engineering Degree at the University of Liege, Belgium, and has received the Heinrich Herz Medal of the Gesellschaft Deutscher Naturforscher in 1928, the Wilhelm Exner Medal of the Industrial Association of Vienna in 1934, and the Francqui Medal at Liege in 1948. He is a member of the American Chemical Society, the American Association for the Advancement of Science, the Society of the Sigma Xi, and the Academy of Sciences in New York, Vienna, Budapest, Bucharest, and Madrid.

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From Philosopher's Toy to Industry's Headache— The Story of Static Electricity

SIDNEY M EDELSTEIN

The story of static electricity is the story of all electricity for 2400 years. Not until the end of the eighteenth century did the science of "electrostatics" go into a decline with the discovery of the voltaic battery and later the electromagnetic generator.

Today the science of "electrostatics"

is once again an important field—particularly for the textile industry. The increased use of the new synthetic fibers has presented many new problems which are due to that force which we call "static electricity".

The present paper traces the development of our knowledge of "static electricity" from the first recognition of the "magical" force by the early Greek philosophers down through the exciting discoveries of Gilbert, Boyle and Franklin, to the most recent work in the textile field.

This paper is presented from the viewpoint of the textile technician and chemist rather than from the viewpoint of the physicist. No attempt is made to give an exhaustive technical account of all the work that has been done.

The purpose of the paper is to present to the textile technician and chemist, a logical and interesting story of the development of another's field of science which he, of necessity, must shortly make his own.

SIDNEY M EDELSTEIN

Mr Edelstein is a graduate of the Massachusetts Institute of Technology, Class of 1932, and a former research associate for the AATCC. He has been actively engaged in research connected with textiles and chemicals for the last twenty years, and is now technical director of the Dexter Chemical Corporation. He has numerous publications and patents in the textile and chemical fields to his credit.

The founder of an outstanding collection of great works, documents and letters in the history of chemistry and related sciences, Mr Edelstein is also a well-known science historian. He has been secretary of the Division of History of Chemistry of the American Chemical Society for a number of years.

Mr Edelstein has been particularly interested during the last few weeks in static electricity on textiles, in which field he is actively supervising research.

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Public Law 845, and the Co-operation between Federal Government and Industry

LOUIS F WARRICK

Mr Warrick was graduated from West Virginia University in 1921 and received the Master's Degree from Cornell University in 1924. He served as a Sanitary Engineer with the Wisconsin State Board of Health from 1925 to 1949. During this period he also served as a member and executive secretary of the Wisconsin State Committee on Water Pollution. Since 1949, Mr Warrick has been Chief of the Technical Services Branch, Division of Water Pollution Control, U S Public Health Service. In addition, he is Chairman, U S Section, Board of Technical Advisers, International Joint Commission; and Executive Secretary, National Technical Task Committee on Industrial Wastes. Mr Warrick is a member of, and has held office in, the American Public Health Association, American Chemical Society, American Water Works Association, Central States Sewage Works Association, Federation of Sewage Works Association, and Conference of State Sanitary Engineers.

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Research in Textile Waste Problems

R HOBART SOUTHER

The rapid increase of textile processing during the past fifty years has created a need for research in waste disposal and means of preventing stream pollution. The chemicals used in treating textile wastes have for many years been the same as now, although calcium chloride was developed by Cone Mills in 1920 for treating waste from indigo and sulfur dyeing. This early research was followed by cooperative studies by a group of Southern mills at Cone Mills plants in collaboration with the North Carolina State Board of Health, and the University of North Carolina, under the coordination of the Textile Foundation. The contributions from these studies have been the chief source of data for others doing research in textile wastes, and a deep debt of gratitude is due these pioneers for publishing their findings.

In spite of the published data, there is still an urgent need for further research in individual plant problems. It is felt that in the textile industry as well as in others, the greatest benefits from research can be obtained in studies to reduce the amount of chemical put into waste at the source in the plant. Studies now being made, it is hoped, will disclose new ways to reduce processing waste by further research within the framework of the recently organized Research Committee on Stream Pollution in the Piedmont Section.

R HOBART SOUTHER

Graduated from University of North Carolina, SB degree in Chemistry 1920; Chief Chemist and Colorist, Proximity Mfg Co, Print Works Plant, Greensboro, N C 1920-1943 (developed original method treating sulfur and indigo dye waste with calcium chloride, 1921); President, S and S Chemical Co, Greensboro, N C 1920-1935 (originated and first marketed resin-bonded pigment water-in-oil emulsion print colors, 1930); Research Director, Cone Mills Corporation, 1914 to present (developed Cone Mills method for Redox control and evaluation of vat and sulfur dye baths and waste dye liquors, 1941); author of technical articles on statistical quality control charts in carding and spinning, starch fluidities, condensation of Vanillin and p-Bromoaniline, Indigo (Vat Monograph), accelerated aging of sulfur colors, and others pertaining to textiles; Chairman Piedmont Section, AATCC, 1952; member National AATCC Research and Stream Sanitation Committees; Chairman Piedmont Section Corporate Membership and Stream Sanitation Committees, Co-Chairman Committee on Accelerated Aging Sulfur Colors, 1942; member ACS, AATT, AAAS, ASQC, ASTM, TRI, N C Sewage Works Association, Textile Quality Control Association (Board of Governors), Phi Beta Kappa, Alpha Chi Sigma, Board of Trustees—Greensboro Evening College, Committee on Stream Sanitation—Southern Association of Science and Industry.

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Stream Pollution Symposium

E A LEONARD, Chairman

To those in the textile industry who have been recently confronted with the stream pollution problem, confusion may arise because of the many different authorities and agencies which play a part. Mr Leonard's introductory remarks cite the relationships among Federal, State, and Municipal groups, which are active in the stream pollution problem. The contribution of the AATCC in working with these many agencies is also discussed.

EDMUND A LEONARD

Mr Leonard was born in New York, N Y in 1919 and moved to Westchester in 1927. He was graduated from Columbia University with a B A degree in Chemical Engineering in 1942, having started work at Alexander Smith Carpet Company in 1941 as an Assistant Research Engineer. He joined AATCC almost immediately after starting work. His major specialties from 1941 to 1944 were the use of plastic emulsions as adhesives, blanket finishing, and application of FWWMRT coating on canvas.

Mr Leonard joined the Navy in 1944. He studied Japanese at the University of Colorado, and translated and interpreted Japanese literature and documents on technical subjects.

Returned to Alexander Smith in 1946, this time he engaged in process development and technical service work. Studying part time at Columbia, he received the MA in Industrial Chemistry in 1948. In 1951 Mr Leonard moved from laboratory to production supervisory work.

The Instrumental Control of Carpet Stock Dyeing

JOHN J HANLON

The use of the GE recording spectrophotometer for the controlled dyeing of carpet stock is discussed. A description is given of the techniques of color measurement which have been in continuous use in a large dyehouse for almost three years. By using these methods millions of pounds of stock have been dyed without the necessity of the dyers having to make visual comparisons to standards.

The desirability of supplementing the spectrophotometric curves with colorimetric values obtained by the automatic integrator is discussed. The use of the chromaticity diagram to act as a "color map" is described and illustrations are given of the use of the "map" in recording the progress of dyeings.

It is felt that by using the scientific techniques of color measurement the training period of a foreman dyer can be cut to a matter of months in contrast to the many years of training and experience usually required.

The setting up of color tolerances and the methods of preparing and mounting samples are discussed.

JOHN J HANLON

John J Hanlon was graduated from the Massachusetts Institute of Technology in 1937 with a B S degree in Mechanical Engineering. After a brief period as a mechanical engineer for a fuel research and development corporation, he returned to MIT and worked in the Color Measurements Laboratory under Dr Arthur C Hardy, who developed the recording spectrophotometer.

In 1939 he joined the Mohawk Carpet Mills, Inc as a color technologist in charge of the Color Measurements Laboratory. In 1942 he went to the Test Laboratory of the Philadelphia Navy Yard where he set up a section for color measurements using the G E recording spectrophotometer. In 1943 he received a commission in the United States Naval Reserve and served overseas as officer-in-charge of a naval mine detail.

After the war Mr Hanlon returned to the Mohawk Carpet Mills, Inc, where for six years he worked in the dyeing department, first as assistant superintendent of dyeing and then as superintendent.

Last December he was appointed to his present post as technical director of the mill. He has served as chairman of the Hudson-Mohawk Section.

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Principles of Copper Dyeing of Polyacrylonitrile Fibers: The Controlled Redox Potential Method

R H BLAKER

A brief review is given of the copper method for dyeing polyacrylonitrile fibers. The theory of the process is presented and a description is given of the influence which the important variables of temperature, pH of the dyebath, and concentration of cuprous ion have on the dyeing.

The application of redox potential measurements to copper dyeing is described in detail. It has been found empirically that satisfactory dyeings will be obtained if the redox potential of the dyebath is maintained within certain millivolt limits. The redox potential of a dyebath depends on several variables but is influenced chiefly by the amount of reducing agent present in the bath. It is, therefore, possible to use redox potential measurements to regulate the addition of reducing agent to a dyebath in such a manner as to insure satisfactory dyeing. The utility of redox potential measurements is illustrated by the description of dyeing procedures based on their use.

ROBERT H BLAKER

Robert H Blaker was born in West Virginia on April 6, 1920. He received his AB in chemistry at Berea College, Kentucky, in 1942. During the period 1943-1944 he attended Massachusetts Institute of Technology. From 1944 to 1946 he was engaged in OSRD research at California Institute of Technology and in 1949 received his PhD in physical chemistry from that institution. He spent the following year at the University of Liverpool, England, on an Imperial Chemical Industries Research Fellowship. Since 1950 he has been employed at the Jackson Laboratory of the Du Pont Company doing research work on dyeing problems.

PROGRAM AT ANNUAL BANQUET

November 8, 1952 • Hotel Statler • Boston

WITH George O Linberg presiding and Walter J Hamburger acting as master of ceremonies the following program will be presented in conjunction with the Annual Banquet:

Intersectional Prize Paper Awards
FRANK J O'NEIL
Chairman Awards Committee

American Dyestuff Reporter Award
PERCIVAL THEEL

President's Address
C NORRIS RABOLD

Guest Speaker
WILLIAM H RUFFIN
President and Treasurer, Erwin Mills, Inc
Durham, N C

Front Head Table guests will include:

G E SINKINSON, *President*
Sayles Finishing Plants, Inc

R C DICK, *President and Treasurer*
Naumkeag Steam Cotton Company

HENRY M BLISS, *President*
Massachusetts Mohair Plush Company

ABBOT STEVENS, *Vice-President,*
M T Stevens & Sons Company

HAROLD J WALTER, *President,*
Bachmann-Uxbridge Worsted Corp

GILBERT VERNEY, *President*
Verney Corporation

T L CLARK, *Treasurer,* Talbot Mills, Inc

FRANK BUSSIERE, *Manager,*
Northfield Mills, Inc

W H HOUGH, *Vice-President*
Enterprise Dye Works, Inc

E A LARTER, *Treasurer*
Wannalancit Textile Company

JAMES STEVENSON, *Vice-President*
Bradford Dyeing Association

W A TRAVER, *Chairman of Board*
Franklin Process Company

RAYMOND CURTIS, *President*
The Kenyon Piece Dye Works, Inc

E DEAN WALEN, *Vice-President*
Pacific Mills

WILLIAM A BROADFOOT, *President*
Aspinook Corporation

H D RUHM, Jr, *President*
Bates Manufacturing Company

OLIVER MOSES, III, *President*
Worumbo Manufacturing Company

ELMER C WARD, *President*
Goodall Sanford, Inc

FRANCIS W WHITE, *President*
American Woolen Company

CLARENCE WIMPLHEIMER, *President*
American Velvet Company

TRACY A ADAMS, Textile Industrialist

EDWIN WILKS, Jr, *Manager*
Slatersville Finishing Company

R V KELLEY, *Manager*
Fairmount Dye Works

TEXTILE WET PROCESSING

A Contribution in Three Parts by New England Authorities

PART I—WOOLEN TEXTILES*

INTRODUCTION

TRADITION has been the greatest hurdle to progress or change in the processing of wool and woolen goods.

As an example I should like to point out that, as recently as 1946 while visiting a reputable worsted dyeing and finishing plant in the midlands of England, I was shown an ancient hydraulic press. In this historic device the full-width fabric was folded carefully by hand and interleaved with fiber pressing-boards. Each fold of the cloth extended two to three inches beyond the edge of each of these boards so as not to produce creases across the width of the fabric at these points. Because these "overlaps" of fabric were outside the pressing area of the boards, it required that, after the first pressing had been completed, the fabric be folded by hand back onto cloth trucks, the pressing-boards removed, the cloth refolded onto the press and the pressing-boards inserted again all in such a manner that the small portions which had not been pressed the first time would be in the press the second time. This press was the owner's pride and joy. He pointed out that the relatively new rotary press which they had bought was practically unused. It stood idle where it had first been installed.

It is perhaps undeniable that the rotary press gives a hard and shiny press, much less desirable in appearance and hand than does the more laborious, time-consuming and cumbersome hydraulic press. It is also undeniable (and my host readily admitted) that the first operation through which the cutter-up or clothing manufacturer puts these goods is a sponging. This removes completely the fine press which was arrived at so expensively as well as the rotary's less attractive press, with equal disregard to the feelings and sentiments of those who took pride in their finished product.

Our processing in New England is fortunately in the hands of progressive leaders and technicians.

Traditionally, our age-old industry stems from the hand operations of the home or family, each raising its own sheep, shearing, scouring, carding, combing, spinning, weaving, dyeing and finishing, according to individual or family needs, desires and skills. True, one neighbor learned little tricks and skills from another and in the slow march of time, minor refinements evolved along with human advances. Alkalies leached from wood ashes improved scouring as did the later advent of soap.

So it is natural that manufacturing techniques should be but adaptations of home handcrafts on an enlarged scale, with increasing productive capacity per man-hour of labor, with constantly improving mechanical and physical know-how and with ever progressing chemical technology.

SCOURING

Synthetic detergents have made a strong bid in some wool-scouring plants to replace soap and alkali, though this is still a moot subject and almost sure to be good for a discussion whenever scourers meet. Such consideration as residual grease content, loft or handle, residual alkalinity, spinning qualities, comparative costs, and a host of other debatable properties are significant. Final settlement of these fine points may not be conclusive even within this decade. Many scourers are still using soap and alkali only. Some by careful control are "suint scouring" using the natural salts and alkalies in the wool itself as the detergents and using very limited quantities of soap and alkali to supplement the suint.

Scouring techniques are in all instances continuous, efficient and economical. Many plants have installed wool-grease recovery apparatus, further reducing scouring costs through the sales of by-products.

Practically all present wool-grease recovery equipment is centrifugal. It occupies very little space as compared to the old methods which required huge settling and acid-splitting tanks, extraction and filtration equipment as well as pipes, pumps and valves galore.

One of the great problems which may face many wool-scourers in the future is the matter of stream pollution. Increasingly, health departments are endeavoring to up-grade the condition of our rivers for fishing, boating, swimming and for other recreational purposes. To produce such results will involve great expense to scourers and may even require a complete change from the use of water as a scouring medium to dry cleaning methods of various sorts.

FINISHING & DYEING

Recent years have brought to the fore several comparatively new developments which have been installed in many plants. Their adoption had depended on several factors including plant capacity, production schedules, variety of styles and management's attitude or individual experience.

Some types of continuous piece dyeing equipment have been successful while others have not fully come up to expectations. Continuous piece dyeing equipment for woolen and worsted goods must be of such a nature in most plants as to permit wide flexibility. Changes of style and shade are frequent in most markets and this is particularly true at present. Therefore, piece dyeing equipment must be versatile enough to produce a few pieces of a given style and shade and permit a quick changeover to accommodate a few pieces of another style and shade.

Changes in finishing equipment have included continuous washers, bigger and better carbonizers, continuous neutralizers, improved sweet dryers, precision hydraulic squeeze rolls, larger and better controlled fulling mills and equipment to control tensions and reduce subsequent shrinkage in sponging.

Continuous washers have been designed almost exclusively to handle goods in the rope form. They usually include the operations of soaping, scouring, rinsing, (sometimes acidifying for a final mild sour), opening, scutching, vacuum or squeeze-roll extracting and folding in preparation for drying.

One type of continuous neutralizer takes the goods full-width from the carbonizer-baker through a bath of alkali solution

* The author of this article is a well known chemist of a prominent New England mill.

followed by passes through running water, sprays and vacuum slots. The alkali bath is constantly fed with strong alkali solution and maintained at constant strength by frequent titration tests or recording pH equipment. The goods make several passes up and down through the tank of alkali in a manner similar to that of the acid saturating tank on the front end of the carbonizer.

Dryers have improved feeds which all but eliminate manual work in the feeding of cloth into the pins. Overfeed mechanisms, which will feed up to about forty inches of fabric onto one yard length of dryer chains, remove the chance of any warp-wise tension during feeding and drying and thus greatly reduce the danger of shrinkage during sponging.

Properly functioning hydraulic squeeze rolls will remove more water than most vacuum slots. This reduces the load on the dryer and speeds up production. Continuous and careful adjustment and maintenance are advisable.

FULLING

Fulling mills capable of handling a full set at a time, equipped with stainless steel metal parts, synthetic rubber-covered rolls, plastic or stainless-steel linings and easily adjustable bars, throats and boxes, permit accurately reproducible settings and are a far cry from the old kicker fulling mill of yesteryear.

IMPETUS OF GOVERNMENT SPECIFICATIONS

Probably every plant in New England has manufactured fabrics for the armed forces during the past decade. This has required closer controls all along the line in order that the finished goods could meet the rigid specifications set up for each fabric. Any tendencies toward slipshod methods have had to be discontinued. What was "good enough" for ordinary civilian requirements, especially to meet keen competition and low prices, has frequently been entirely unsatisfactory for minimum government standards. Painstaking personal scrutiny by quartermasters' inspectors have introduced a military discipline which has not been without its values to the industry as a whole. In many instances it has been refreshing and educational to realize that by adequate controls in the executive, administrative, supervisory and operative personnel, as well as qualitative and quantitative mechanical controls, there have been surprising reductions in seconds and inferior goods. Standards *can* be met and in producing to such standards, costly wastes and allowances can be reduced sharply.

The production of goods for armed forces has also introduced an increased consciousness of new fabric qualities which may have sales appeal in civilian lines. Some of these are shrinkproofing, water repellency, abrasion resistance and the admixture of the various synthetic fibers.

Shrinkproofing is doubtless here to stay. Woolens and worsteds are increasingly being marketed with specified limits of shrinkage control. This will apply both to sponging (relaxation) shrinkage and laundering (felting) shrinkage. Shirts, slacks and skirts can be tubbed and laundered without the disastrous results of yore. An important phase of these specifications is the need for uniform and reproducible methods of testing for the protection of consumer and manufacturer alike. These are already provided by AATCC and by government methods now adopted and recognized in the trade. Shrinkproofing methods include several types of chlorination and resins. Experimentation is being conducted on continuous chlorination in open width.

Water repellency for woolens and worsteds has been attained within limits. Here again as in shrinkproofing, agreed-upon standards, tolerances and test methods are subjects of limitations by recognized specifications.

Abrasion testing is still in its infancy. Many testing devices have been invented, several of which are in constant use. So far it is generally agreed that at best each testing device will furnish results which compare the wearability of one fabric against another and then only within the limits of the particular abrading machine. This is a promising area for future exploration and one which is bound to result in better fabrics for the civilian consumer as it already has for the armed forces.

SYNTHETIC FIBERS AND WOOL

The blending of synthetic fibers with woolens and worsteds and their proper finishing is doubtless the greatest single development of the moment and for the immediate future. Much experimentation is in process. Many promising fabrics are in hand or in prospect. Problems are legion.

One of the serious hazards of manufacturing blends or combinations of synthetics with wools, is the problem of wastes. Many of these synthetics cannot be processed with re-used woolen stocks because they cannot be piece dyed, speck-dyed or carbonized in the presence of wool. If through inadvertance these stocks become mixed with all-wool fabrics, almost insurmountable problems are created.

Crease retention, increased wear, greater tensile strength, dimensional control, static electricity, finishing techniques, dyeing problems, light fastness, dry cleaning fastness, perspiration fastness, drape, "hand", cost, consumer reactions, and the appeal of the new are but a few of the highlights of the problems and the promise of this intriguing area of intense activity which now fills the waking hours of technicians with experimentation and their sleeping hours with nightmares.

New England woolen and worsted processing technology continues to pace the industry.

PART II—COTTON TEXTILES

W W EVANS

Technical Director,
Exeter Manufacturing Company

INTRODUCTION

THE past decade has seen numerous fundamental changes in the wet processing of textiles in general, and cotton in particular. These have resulted largely from the work of technologists in other branches of the chemical manufacturing industry studying the effect of their products on cotton yarns and fabrics and transmitting the resulting information or product through their sales representatives to the superintendents or chemists of the various finishing plants.

The results obtained from the combined efforts of the chemical manufacturer and the textile finisher have brought about far-reaching changes in the wet processing

of cotton textiles, have greatly stimulated further research in our textile schools and government laboratories, and have prompted the sponsoring of research by cotton manufacturers in several prominent educational institutions. It seems reasonably safe to predict that, in the not too distant future, because of increased knowledge and improved techniques for better control, the finishing of cotton textiles will give better and more uniform fabrics with an increased variety of finishes to serve a greatly expanded number of end uses.

BLEACHING

Ten years ago the commonly accepted procedure for bleaching cotton fabrics was a kier boil and "chemic". This method with minor variations had been the accepted way for bleaching cotton for a long period of time. The peroxide manufacturers did succeed in a limited way in replacing the "chemic" (hypochlorite) with a peroxide kier bleach, though the advantages from this change were insufficient either cost- or quality wise to bring about its general adoption.

During the year 1939 announcement was made of a continuous process for bleaching cotton fabrics. The chemical manufacturing companies interested in this development did their work well. Instead of simply trying to promote the sale of peroxide a complete study was made of the steps in wet processing cotton from grey goods through the completion of bleaching with the result that a major contribution was made to cotton processing. The chemists and chemical engineers of the peroxide manufacturers made a thorough study of the steps necessary to prepare and whiten cotton grey goods so that upon completion of the process the fabric would have the proper whiteness, absorbency, and other characteristics required for dyeing or finishing.

The radical change brought about by the "continuous bleaching process" was the elimination of the kier which had been the most important unit in all previous processing.

The fundamental that makes the continuous peroxide bleach possible is based on the use of direct steam to heat the cloth and provide suitable storage for the heated cloth———to permit the necessary chemical reactions to take place.

The large quantity of water used in the kier is eliminated, thereby making the first substantial saving, i e, steam. The use of steam resulted in higher operating temperatures which in turn necessitated adjustment of time, temperature, concentration of chemicals, and pH control. It goes without saying that the optimum conditions were not arrived at without many trials and the development of suitable chemical control.

The key to the whole process depended on the development of a suitable storage for the steam-heated cloth containing the chemicals. This was accomplished by developing the J-Box of stainless steel and properly insulated to maintain the necessary high temperature. Replacement of the kier with the J-Box, and the use of steam for direct heating has given the cotton finishing industry a quick and reliable continuous method for preparing and bleaching cotton fabrics, provided the most economical use of chemicals and an efficient method of handling cloth.

The cotton finishing industry quickly accepted this new process with the result that today a very high percentage of all cotton fabrics are bleached by the continuous peroxide method. It is obvious that the chemistry and mechanics of any process as important as this in scope would be the subject of many studies and comparisons with earlier processes. Among these may be noted Technical Bulletin 941 of the U S Department of Agriculture *(1)* and an article by Bell and Stalter *(2)*. These and other papers point out what actually takes place during the bleaching operation, and how, if proper control of the process is maintained, the continuous peroxide bleach method will give whiteness, absorbency, and dyeing quality equal to previous methods.

The procedures followed by the continuous bleaching process are as follows:

Singe
Desize
Wash
Caustic J-Box
Wash
Peroxide J-Box
Wash

The first three operations are similar to previous methods except that they may be set up to run continuously using a J-Box for storage of the enzyme-treated cloth at high temperatures (180-200°F). In many cases the enzyme-treated cloth is given pit storage overnight prior to washing and a continuous process of caustic treating and peroxide bleaching.

To insure uniform results careful attention must be given to certain fundamentals.

1) The cloth must be uniformly saturated with the proper amount of caustic soda. This requires control of pressures on the squeezer from the desize washer and on the saturator to permit the proper pickup of the caustic solution. The addition of a penetrant stable to caustic will assist in uniformity of penetration of the roped cloth.
2) The saturated cloth should be quickly heated with enough steam to maintain a J-Box temperature of approximately 210°F and thereafter placed in storage for definite established periods depending on the type of cloth.
3) The caustic processed cloth should be washed so as to be sufficiently free from alkali preferably with warm water so that there will be no disturbance of the alkali-silicate balance in the peroxide saturator.
4) The cloth should be saturated with peroxide (observing the same squeeze and pickup control as with the caustic), heated to the optimum bleaching temperature and maintained at that temperature until the desired bleach is obtained.
5) The bleached cloth should finally be washed with warm water to remove all chemicals and reaction products, and subjected to washing until test indicators show the cloth to be substantially neutral.

No specific formula covers all processing conditions, these being varied to suit weights of cloth, water conditions, etc. It is generally conceded that a penetrant stable to alkali is beneficial in getting more even distribution of the saturating solutions, and that the use of sequestrants, such as the polyphosphates or the organic type, will improve both the caustic treatment and give better whites from the bleaching operation.

The overall picture at the present time finds a very large percentage of cotton bleaching done by the continuous method and it will largely (if not completely) replace batch methods. Run with proper technical control, cotton handled by continuous peroxide bleaching can be used for subsequent dyeing or finishing as well as that bleached by any other method.

DYEING

Substantial improvements in the dyeing of cotton fabrics have been developed in recent years. Jig dyeing methods on all but small yardage or special constructions have been replaced by continuous methods. The first of these to be generally accepted was the pad-steam method by Du Pont. Basically the process is as follows:

The (vat) color is applied as a dispersed pigment and dried. The cloth is then run through a solution of caustic and hydrosulfite, and directly into a chamber (steamer) filled with saturated steam free from air. This causes an immediate reduction and fixation of the color thereby giving good penetration and color value. From the steamer the cloth is given a rinse, acid oxidation, and hot water wash.

The new feature in this development and the one which makes the process possible is the operation of the steamer at temperatures of 212-215°F, which causes instant reduction of the vat pigment that had been previously padded on the cloth and dried and then wet out with caustic and hydrosulfite just prior to steaming.

The development of this pad-steam process has made possible numerous advantages to the cotton dyer:

(a) A full range of vat colors from light to dark shades can be dyed continuously.

(b) Colors of different dyeing properties can be used together because, in their application as pigments, they have no coloring value and, being in dispersed pigment form, there are no limitations so far as concentration is concerned. The steamer causes instant reduction so that rates of exhaustion are not a factor, consequently slow- and rapid-dyeing colors can be applied as dispersed pigments, reduced and developed without difficulty. The color value and the fastness and appearance of the dyeings are equal to or are better than those produced by previous jig dyeing methods.

(c) Labor costs are substantially lower. The dyeing range as set up for this continuous process consists of either one or two pads, the steamer, five to eight wash boxes, and frequently a bank of dry cans; consequently dyeing, washing, and drying can be carried on continuously. This arrangement has the further advantage that the same equipment may be used for dyeing sulfur colors or napthols on cotton fabrics continuously. With napthols the steam is turned off and the steamer used as a "skyer". With sulfur colors the steam is left on just as for vat colors; the dissolved dye is padded on hot, then run directly into the steamer for fixation, through a wash, oxidation, and a final washing. Excellent results both as to color value and wash fastness can be obtained from sulfur colors dyed continuously with this equipment.

In March 1947 S H Williams, speaking before the New York Section, described a newly-developed piece of equipment known as a Williams Unit, which has proved itself to be a valuable addition in the wet processing of fabrics in general and cotton in particular *(3)*. The unit is so designed that the physical action of the solution on the cloth while in the unit results in improved penetration and more level dyeings. The Williams Units can be combined with padders, dryers, and dry-cans to give an all-purpose range for high-speed dyeing, aftertreating, and continuous washing. A range of this type permits the continuous dyeing of cotton piece goods with all classes of dyestuffs, ie, vats, sulfurs, directs, and napthols. In addition to their use in dyeing these units have been very effective washers and are being used as such on mercerizing ranges and on continuous open-width bleaching ranges.

The versatility of the Williams Unit was increased in 1951 with the introduction in 1951 of the Hot-Oil Continuous Dyeing Process *(4)*.

The success of continuous vat dyeing in large measure has been due to the use of higher temperatures to bring about an equilibrium between the cotton fiber and the leuco color compound using minimum volumes of solution.

Using a Williams Unit as a container and heater for mineral oil and maintaining a temperature of about 225°F and a liquor volume of only the pickup of the caustic and hydrosulfite by the fabric, an instantaneous reduction of the dye results. The method provides a means of working with dye solutions substantially above the boiling point of water without the use of closed equipment. Past work has shown marked improvement in color fixation at higher temperatures with much faster dyeing time. The hot oil is removed immediately after its use as the reducing or fixing bath by passing the cloth through cold water containing a suitable detergent, and then proceeding with the usual oxidation and washing. The process operates successfully on vats, sulfurs, and some direct dyestuffs. It gives very good uniformity in dyeing, better dyestuff and chemical values, and makes possible highspeed production.

Another process for continuous vat dyeing recently announced is the Standfast or Molten Metal Process *(5)*. Molten metal is used as the medium in which the fixation of the dye takes place. A narrow metal slot extending about two inches below the surface of the molten metal serves as the dyebath, the solution floating on the surface of the molten metal. It is claimed that, due to the small size of the dyebath, short yardages can be run economically, that color changes can be made very quickly, and that excellent uniformity of dyeing is obtained. The process to date is confined to vat and direct colors.

From the evidence presented it is apparent that today the dyer of cotton fabrics has available equipment for continuous dyeing with all types of dyes normally used on cotton. With it he can do a better job more easily than was done on jigs only a few years ago. The increase in dyeing capacity necessitates increased process control during the dyeing operations, however, as well as a recognition of the chemistry involved in dyestuff application. Vat colors represent one of the principal types of dyestuffs applied to cotton fabrics. The most important step in the application of vat dyes is the reduction to the soluble leuco form. The chemical reduction of the dyestuff to the soluble form is accomplished by treating it with alkaline hydrosulfite.

A method for accurately measuring the conditions for reducing vat dyestuff and the development of an instrument for the automatic recording of conditions in the dyebath so that the proper amounts of alkali and hydrosulfite can be fed to maintain the optimum conditions for dyeing vat colors has been introduced by Marnon *(6)*. In the reaction which takes place between the caustic, hydrosulfite, and dyestuff, the dyestuff is reduced and the hydrosulfite oxidized. The reaction between the caustic and hydrosulfite develops a definite reduction capacity which can be accurately measured by suitable electrical instruments. By knowing the reduction capacity for the various dyestuffs an accurate method of controlling the rate of feed of caustic and hydrosulfite can be determined. This makes possible definite and constant reducing conditions and a uniformity of dyeing not previously possible. It can be used for jig or continuous work and may be used equally well for maintaining uniform conditions of reduction and oxidation during the dyeing of sulfur colors. The equipment should be of great help in improving control of dyeing conditions and saving of chemicals in any dyehouse. It provides another yardstick to take variations out of dyeing and put the process on a definitely controlled basis.

FINISHING

The fact that the *Technical Manual and Year Book of the AATCC* gives over eighty pages to the description of Textile Chemical Specialties is ample evidence of the great number of materials used. Most of these are used in some manner in finishing operations to effect the hand or appearance of the fabric for some particular end use. Until recently practically none of the finishes applied to cotton fabrics had any permanence. Within recent years interest has increased in the application of resin finishes to provide permanence to the finish, improve dimensional stability, and improve resistance to creasing and soil. The important applications of the durable resin finishes on cotton are for imparting wrinkle resistance and shrinkage control, and, in increasing quantities, for producing durable embossed or glazed finishes.

The principal resins used for this work are of the urea-formaldehyde and melamine-formaldehyde types, or mixtures of the two. The many available treatments

have only partially solved the problems of crease resistance and shrinkage control of cotton fabrics, and the situation presents one of the more important research problems for solution by cotton manufacturers and suppliers of the resins. Possibly a better approach to the problem would be a study of chemical reactions to modify the molecular structure of the cotton fiber itself. It is reasonable to assume that if chemistry can produce an ever-increasing number of new synthetic fibers, each with varying physical properties, then an equivalent amount of study applied to the chemistry of cotton can produce very fruitful results.

FUTURE TRENDS IN COTTON PROCESSING

Dr Walter Scott reported on the activities of the Southern Regional Research Laboratories in an article "Trends in Chemical Processing of Cotton Fabrics" *(7)* which the textile technologist dealing with cotton would do well to study seriously. From the work which has been started, and the preliminary results obtained, the way clearly points to chemical modification by reaction of chemicals with cotton cellluose. It has already been shown that by partial acetylation fabrics can be produced which are resistant to mildew, rot, and heat. Other treatments include carboxymethylation, which causes the cotton fabric to be more absorbent up to the point of dissolving, depending on the degree of treatment. Aminized cotton has improved dyeing characteristics and can be used with some of the wool dyes; it also provides means for obtaining improved washfastness. Aminized cotton can also be given other chemical treatments to obtain water repellency and rot resistance.

These few examples point the way toward which cotton manufacturers should be looking for cotton finishes of the future. The chemical manufacturers and the textile technologists have made rapid progress in cotton finishing both in equipment and method. It seems likely that this will increase in the future, giving new types of cotton fabrics and continuing to keep cotton in the dominant position which it has held for many years.

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PART III—PRESENT-DAY SYNTHETIC FIBERS AND BLENDS

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INTRODUCTION

UNTIL the beginning of this century, textile fabrics had been produced almost exclusively from natural fibers, and though the search for substitutes has been going on a long time, it is only within the past twenty-five yëärs that synthetic fibers have been produced on such a scale as to compete with them.

Through the ingenuity of research, a great many new types of man-made fibers have been introduced within the last few years, many of which have proven to be of practical value.

Synthetic fibers are assuming more and more importance in the textile industry. These new products are being "tailor made" to do a specific job and offer a considerable challenge to the dyer and finisher. Each one presents a problem in dyeing which varies in complexity depending on the end use of the fiber.

The synthetics of major importance today, in my opinion, are viscose, acetate, nylon, Fortisan, Orlon, Dacron, and Acrilan. No doubt there are other new synthetics that are also important but which are probably going into end uses with which I am not familiar. Since it will be impossible for me to cover all the details of these fibers, I will cover only the high points.

VISCOSE & ACETATES

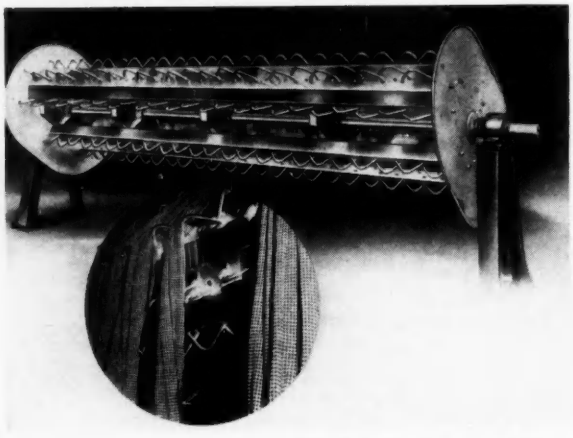
The actual production of these two fibers for 1951 was 1,294,000,000 lbs and it is estimated that production will be about 1,714,000,000 lbs in 1953. These two man-made fibers are growing and undoubtedly will continue to do so.

Fabrics of spun rayon, spun rayon/acetate, and other mixtures are being widely used in the manufacture of wearing apparel, especially for sportswear. If the consumer is to receive satisfactory service from these garments, and if the manufacturer is to build up a large and steady sales volume, then the colors must be of good fastness. Selected fast to light direct colors that are not adversely affected by stabilizing resin finishes are extensively used for these fabrics. The demand for fast-to-washing shades has increased, and vat colors are necessary to meet this requirement; for darker shades the use of those direct colors whose fastness to washing and fastness to light are improved by an aftertreatment with a fixing agent and copper salt is acceptable. One of the simplest methods for this application is to combine these chemicals with the formaldehyde resin used in finishing. The goods after being dyed are padded, dried, and cured in the conventional manner. A large proportion of the vat dyed goods are now dyed on the pad-steam continuous range and Williams Unit continuous range.

The molten-metal (or Standfast) process is an English development which has created a lot of interest in this country. In this process a low melting alloy is kept at 205°F in a U shaped vessel and serves as a heating transfer medium. Apparently the metal cannot be heated above 212°F or steam bubbles will form on the cloth; this gives turbulence in the metal and results in streaky dyeing. No detailed information has reached us as yet about the application of this process for the newer synthetic fibers.

The hot-oil process is a new dyeing method developed by General Dyestuff Corporation. In this operation a mineral oil is used at a temperature of 225°F in a Williams Unit. The oil is used as an inert, oxygen-free, heat-transfer medium. This process may lend itself to continuous vat work on tightly woven or viscose fabrics. At the present time, the only available information on this process deals with the application of vat and sulfur colors on cotton.

The increasing use of acetate rayon has emphasized the importance of the application of durable gas fading inhibitors; these are applied simultaneously with the acetate colors. I should like to state that



(Courtesy of James Hunter Machine Co)

Hunter No/Lap Reel—used in dyeing of the new synthetics and other lightweight goods. Makes possible full time use of the dye beck.

(Courtesy of Andrews and Goodrich)

Drying and Curing Range—Resin is dried on goods in tenter while being framed. It then enters the gas-fired curing oven and is polymerized.

all of us should be quality conscious at all times in the handling of fabrics made of viscose and acetate.

NYLON

Since nylon may still be considered a relatively new fiber, it is interesting to note its many uses in present-day fabrics for both civilian and military consumption. For example, our armed forces are using nylon in twill and ripstop parachutes, coated ponchos, parapack, nylon and spun tow rainwear, cotton and nylon oxford, etc.

The dyeing and finishing problems have all been minimized through experience and research, and any well-trained synthetic dyer and finisher should be as well versed in the handling of nylon fabrics as he is in the handling of viscose and acetate.

PRESETTING ——— The presetting operation, intended to shape the fabric and prevent distortion, takes advantage of the thermoplasticity of nylon, which is softened by heat. Nylon fabrics after heat-setting will retain the shape they had at the time of freezing from a semiplastic condition.

Heat-setting processes for nylon fabrics generally increase the tenacity with which soil is held; therefore, the dyer must route his styles accordingly for heat-setting or scouring first.

SCOURING———Nylon is not affected by alkali, and alkalies such as soda ash, trisodium phosphate, and even caustic, in conjunction with water softness and soap are all suitable for scouring nylon at temperatures commensurate with the presetting temperature and cloth construction.

Scouring is done on jigs, Henniken open-width machines or becks depending on construction.

DYEING ——— The dispersed acetate dyes are at present still best suited for dyeing nylon because of their levelling properties, excellent affinity, and ability to build up to heavy shades. These dyes are best for eliminating barre effects, filling bands, and warp streaks. The acetate colors are quite satisfactory in fastness to light, but are lacking in fastness to washing and perspiration.

Increased fastness to light, washing and perspiration is obtainable by use of selected acid colors applied from an acid bath. Selection of colors must be based on proper fastness without accentuating too much the warp streaks, filling bands, etc.

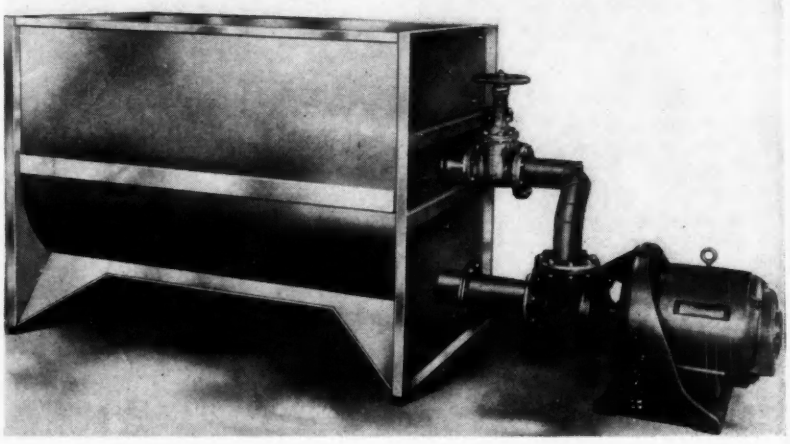
The dyeing of these colors is carried out at near the boil. In jig work the cloth can be subjected to the proper temperature only in an enclosed type of jig.

Nylon piece goods in the future will, perhaps, be dyed continuously. Work and study in this direction was presented in the Rhode Island Intersectional Contest Paper of 1950.

DACRON POLYESTER FIBER

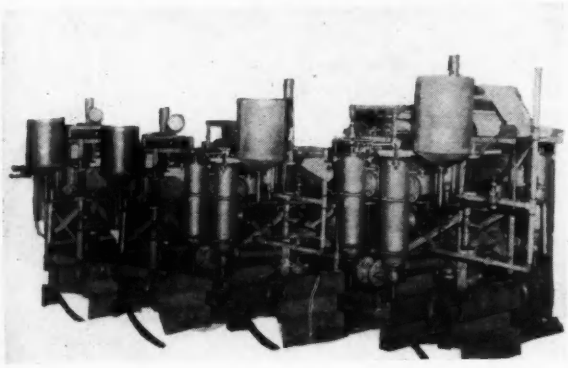
At the present time Dacron is being made in limited quantities in a pilot plant. Yardage of all filament fabrics and 50/50 blends of staple Dacron and viscose have now been processed on practical production scale.

The functional properties of Dacron include high wet and dry resilience, dimen-



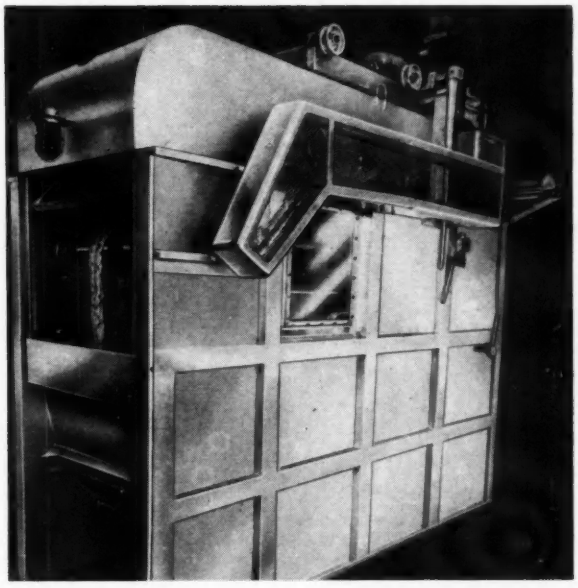
(Courtesy of Burlington Engineering Co, Inc)

Pressure Bleach, Boil-off and Dyeing Machine—for tricot, marquisettes and lacey fabrics.



(Courtesy of Hussong-Walker-Davis Co)

The Bond Dyeing Machine—a new type of dyeing and scouring machine which can be used as a continuous or single type machine. (This machine is being sponsored by Pittsburgh Coke & Chemical Co.)



(Courtesy of Rodney Hunt Machine Co)

Rodney Hunt Beck Type "52"—for a full range of fabrics from heavy felt to nylon tricot. A duel reel and plaitor cloth handling system prevents slippage or surging.

sional stability under wet or dry conditions, and stretch resistance coupled with high strength. These properties give the ultimate consumer more for his money in ease of care, freshness, and neatness.

SCOURING———The scouring of Dacron is carried out by the usual procedures for hydrophobic synthetic fibers. A satisfactory method is to scour at 160°F for 30 minutes in a bath containing about 0.25% of an anionic wetting agent.

DYEING ——— Dacron is best dyed with acetate colors at or near the boil with a carrier. Many carriers have been tried with varying degrees of effectiveness, including ortho-phenyl-phenol, para-phenyl-phenol, trichlorobenzene. The field of "carrier dyeing" is quite active and new compounds may be found shortly which will be more effective, cheaper, and less toxic.

Du Pont has recently announced a series of "Latyl" colors for Dacron which reportedly exhibit excellent light fastness. These are:

"Latyl" Orange R
"Latyl" Red B
"Latyl" Violet B
"Latyl" Brilliant Blue 2G
"Latyl" Blue 3R

All the leading dyestuff companies now have available literature listing dispersed dyes that are recommended for application to Dacron.

Of the new developments in dyeing, the use of high temperatures seems most promising for the synthetic fibers. Equipment for dyeing at high temperatures is not generally available to the textile industry, except for stock or package dyeing machines which can be pressurized.

The advantages of high temperature pressure dyeing of Dacron are (a) rapid and efficient absorption of dyes, (b) no carrier required (which accounts for large savings in the cost of dyeing, and (c) better fastness of deep shades.

The Barotor, a new fabric dyeing machine, has recently been developed by the research staff of Du Pont for the pressure dyeing of the newer synthetic fabrics in open width piece form.

The dyeing of Dacron-rayon piece goods offers no particular difficulties. Selected fast directs are employed to dye the rayon and to leave the Dacron white. For solid shades the Dacron is dyed first by the carrier method, after which the rayon is brought to shade.

Vat dyeing, of course, gives the best fastness and the procedure is to dye the Dacron by the carrier method, soap, dry, and then vat dye the rayon. This technique gives surface stripping action on the Dacron, resulting in excellent fastness.

ORLON ACRYLIC FIBER

Two types of Orlon acrylic fiber are being offered, 81 and 41. The 81 occurs as filament, cut filament ("fiberstock") and yarn produced from "fiberstock". Type 41 is produced as staple fiber and is avaliable as rawstock or yarn. Orlon is characterized by unusual stability to weathering, chemical inertness, bulking value, and wool-like feel. Type 41 appears to have better affinity for dye than type 81.

Acceptable dyeings on piece goods will be achieved only by controlled processing steps during yarn and fabric preparation. Our experience to date has shown some irregularities, such as filling changes and warp streaks.

These dyeings were produced by the cuprous ion method, i e, applying selected acid colors at 210°F. High uniform temperature throughout the dye tub is important in this case. Additional steam lines are reqiured in the conventional dye beck plus an open steam line near the top to maintain a steam atmosphere.

Orlon tends to cling and rope; therefore, the use of a reel designed to make the goods change folds during beck dyeing is desirous. Another technique used to open the material is to tack and place a hollow ball into the tube. The steel ball is partially filled with water and allowed to float partly submerged.

The high temperature dyeing process mentioned under Dacron lends itself very well to Orlon.

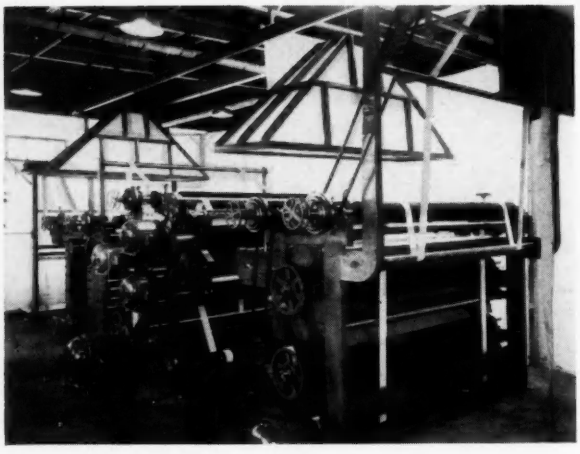
Du Pont has recently announced a group of "Roracyl" colors for Orlon which exhibit excellent light fastness. These are:

"Roracyl" Orange R
"Roracyl" Violet 2R
"Roracyl" Dark Green B

THERMOSOL

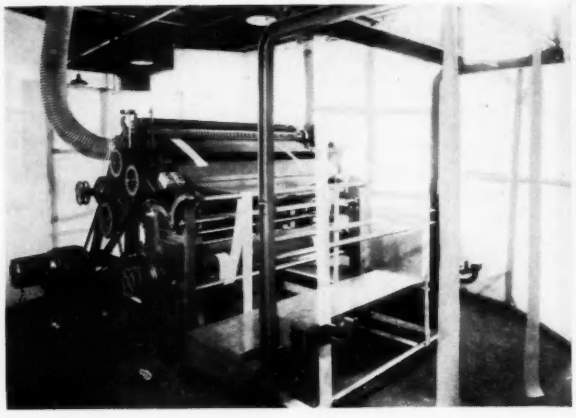
The thermosol process is an interesting technique and hold promise of becoming practical. In this process a surface coating of dye is applied to the fabric from a liquid medium through a padder. As the goods travel from pad to dryer, it is desirable to avoid contact with any stationary surface in order not to disturb the coating.

The next step is flue or balanced dryer. Migration of color must be controlled



(Courtesy of Parks & Woolson Machine Co)

The Sueding Range, a continuous napping, sand brushing, shearing and steam brushing, treating both sides of the fabric at the same time. The development is expressly for spun synthetics. Production: 50 yards/min (one attendant). No headings or waste ends.



(Courtesy of Parks & Woolson Machine Co)

Single blade Davidson shear with sand brushing cylinder.

during this step. After the fabric has been dried it is exposed for a short time at a high temperature, usually above 360°F. During this heat treatment the color appears to dissolve in the fiber, producing a dyeing fast to washing and crocking. This fixing treatment is followed by a scour to remove any of the assistants used in the coating step and to remove surface colors which might not have been fixed during the heating step.

To date we have processed several small production lots in dress shades on both spun and filament Dacron with reasonable success.

Research, trial and error, and the ingenuity of the practical dyer will iron out the few remaining "bugs" in this process.

ACRILAN

Acrilan, a product of Chemstrand Corporation, is another acrylic fiber modified by copolynization with a small amount of another resin. This fiber is wool-like, having warmth, stability, and bulking power.

Our experience to date has been somewhat limited with this fiber. However, we have had good success with selected acid dyes on our limited production.

The following acid dyestuffs have been used with good results, applied at the boil with the addition of acid:

Xylene lite Yellow 2G—CI 639
Supramine Red 3BA—Pr 193
Cracine Scarlet MOO—CI 252
Alizarine lite Brown BL—No prototype
Alizarine Supra Blue A—Pr 12

These colors seem to give the best dyeing properties and very good fastness.

PIGMENT-RESIN PAD DYEING

Most all synthetic fabrics can be satisfactorily pad dyed, the exceptions being due to the type of weave rather than the nature of the basic fiber. It is true that light and medium shades offer greater possibilities than dark shades since the economics of pigment-resin colors are questionable in heavy strengths and an undesirable boardy hand frequently results. This is not necessarily a handicap because pigment-resin colors are at their best in the shade range where dyestuffs are weakest in durability. When properly selected and applied, pigment-resin colors can be utilized by the dyer of synthetics to great advantage when one considers the excellent light fastness, dry cleaning, crocking, and wash fastness properties in conjunction with the higher percentage of first-grade finished goods, due primarily to shade continuity.

FINISHING

The textile finishing art is probably as old as textile manufacturing. It is practiced to enhance the general appearance and sales appeal of fabrics as well as to provide qualities to textile fibers that they do not normally possess. The fabrics so treated become better adapted to specific purposes. The finishing processes fall into two main classes: mechanical and chemical. Mechanical finishing, such as heat-setting, framing, decating, and calendering, is frequently essential and has an effect not only on dimensional stability but also on the hand of the fabric. Of course, it is very frequently advantageous to augment the mechanical treatments by the use of textile chemical auxiliaries; for example, the scouring and cleansing of the fabric with detergents is necessary to produce good appearance.

Agents to control luster are often desirable, particularly on the newer synthetics. The draping and bodying characteristics are regulated generally by heat treatments, softeners, or resins. Agents for reducing and eliminating the formation of static electricity are highly desirable. The newer synthetics are relatively non-absorptive to water, but treatments that impart additional water repellent properties to the fiber surface may be required for the end use of the fabric. Products which increase slip resistance of the yarns are sometimes needed to prevent seam slippage and to maintain freedom from distortion within the fabric itself.

STATIC———One of the major problems in handling the newer synthetics is the development of static electricity on the fabric during processing and handling. If a satisfactory antistatic finish is not employed sparks may occur while the finished fabric is being inspected, much to the discomfort of the inspector. The presence of a static charge is also a handicap to the cutter in garment manufacturing when multiple layers of fabrics for cutting are laid out since it causes the fabric layers to wrinkle and distort and thereby makes the cutting of accurate patterns very difficult. Because of static attraction, the fabric will also pick up lint and dirt during the cutting and sewing operations.

PILLING———The problem of pilling on Dacron is being minimized by singeing closely, then napping and shearing during the final finishing operation.

The application of thermosetting resins, such as urea-formaldehyde, melamine-formaldehyde, etc, is effective for producing wrinkle resistance, shrinkage control, stretch- or distortion resistance, retention

of embossed or surface pattern effects, and modifications of hand. The wet fastness properties of some dyestuffs may also be improved by such resin treatments. Viscose fabrics and blends containing viscose respond particularly well to resin treatment and show many other unique advantages, such as improved wet strength, decreased dimensional change with varying humidity, shrinkage stability on multiple laundering, ease of ironing, and longer life.

Thermoplastic resins are also useful in the finishing of these synthetic fabrics and may be used to produce more body or fullness and firmer hand or as binders for pigments for delustering or coloring. For these purposes, these products may be used alone or in combination with the thermosetting resins according to the end use of the fabric and the properties desired. Among the long list of commercially available thermoplastic resins are the polyvinyl chlorides, acetates, copolymers, the acrylates, the methacrylates, polystyrenes and many others.

With proper selection and use, synthetic resins are a valuable tool for the finisher and are extremely useful for the enhancing of properties of synthetic fibers in quality fabrics.

THE DRYSALTERS CLUB OF NEW ENGLAND

GEORGE O LINBERG

President

THE Drysalters Club of New England was organized on March 11, 1885, and is the third oldest combined social and business club in New England, antedated only by the Wool Manufacturers (1865) and the New England Paint and Oil Club (1884).

As all the members of this organization represent the dyestuff and chemical industry, there has been considerable discussion, especially as to the origin of the name, The Drysalters Club of New England. The name, Drysalters, is Old English for a dealer in dry chemicals; it later was applied to a dealer or a manufacturer of crude concentrated dyestuffs.

When The Drysalters Club was formed originally, it was for a purpose that would be considered illegal today—the exchange of information for the controlling of prices and standards. The original nature of this group was not social, but distinctly for business reasons, i e, to keep prices constant or rising. Their ideas of service to the textile industry differed very greatly from those of the chemical industry at the present time. As time went on, good fellowship developed, and their four meetings a year (one in the fall, one in the winter, one in the spring, and the annual outing) branched out to include guests at the fall and winter meetings and the annual outing.

The Constitution of this organization has been changed many times, and at present it resembles the original organization in name only.

The members were limited to the principals of the chemical concerns located in New England; no one but the President or the Manager was eligible for membership. In 1920, the Bylaws of The Drysalters Club were materially liberalized, junior members of the dyestuff and chemical concerns were admitted to membership, and many of the old committees were abandoned, such as those that were used for price control.

The organization at the present time is social in nature, and has four meetings a year, as orginally planned, at which guests are invited. Back in the early twenties, only one guest was allowed per member, but at the present time, the guests at all meetings generally outnumber the members better than two to one.

The object of the Club at the present time is to provide the very best food and entertainment for its members and guests at meetings. The outings for the past few years have been attended by well over three hundred individuals and it is a day set apart entirely, not only for the members, but for their guests. In fact, friendliness is a basic quality of The Drysalters Club, which is run on a nonprofit basis (an unwritten law requires that the incoming President leave no more money in the till when he leaves than was there when he arrived).

98 per cent of the Club's members are also members of the AATCC.

From its original membership of 51 the Club has grown to 120, but its membership is still confined to the men in the dyestuff and chemical industry.

The Annual Outing draws men from all sections of the country, as it is unique in its quality, with emphasis on good fellowship and food.

PROGRAM FOR THE LADIES

1952 AATCC Convention • Boston, Mass

Thursday Afternoon, November 6, 1952

Complimentary Tea at the Boston Women's City Club. All ladies, members or guests, are invited.

Friday Morning, November 7, 1952

A trip to the following interesting places:

1. The First Church of Christ Scientist. The newly rebuilt and enlarged organ has the largest number (13,389) of pipes in any church in the United States.
2. The Dard Hunter Paper Museum at Massachusetts Institute of Technology.

Friday Noon—

Luncheon at Ola's—Behind the Iron Gate.

Friday Afternoon—

A trip to the following unusual places:

1. "Adventures in Light and Color"—a visit to the studio of Charles J Connick Associates to see the various stages in the manufacturing of stained glass windows.
2. The State Street Trust Company to see one of Boston's leading collections of antiquities.

Friday Evening—

Concert by The Boston Pops Orchestra, Grand Ballroom, Hotel Statler.

Saturday Morning, November 8, 1952—

A trip with the following interesting features:

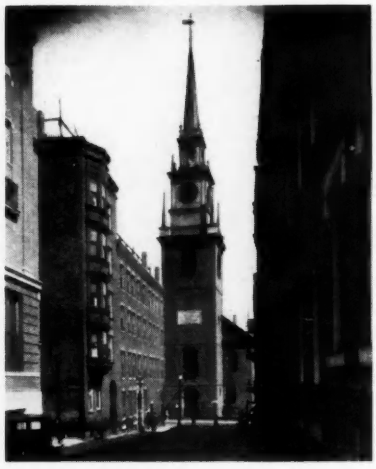
1. The Harrison Gray Otis House. A luxurious early American Home Built in 1795.
2. The Old North Church—made famous in Longfellow's poem, "The Midnight Ride of Paul Revere."
3. A tour of Boston's Chinatown, including a luncheon in one of the restaurants of New Chinatown. After luncheon there will be a visit to the new Chinese Merchants Building and the Interdenominational Christian Church of New England.

BOSTON — THE CONVENTION CITY

BOSTON, the scene of the 1952 AATCC National Convention, is the oldest large city in the United States and was founded in 1630 by a chartered company of English colonists under the governorship of John Winthrop. It was named Shawmut by its Indian inhabitants and Trimontaine by the early settlers, receiving its present name on September 17, 1630 after the town in Lincolnshire, England, from which many of the company had come. In 1632 it became the capital of the Massachusetts Bay Colony and is today capital of the Commonwealth of Massachusetts.

The first printing office in the United States was established in Boston and the first regular newspaper, the *Boston New Letter*, was published there in 1704. America's first public school, the Public Latin School which is still in existence, was started in 1635 and Harvard College, the country's oldest institution of higher learning, was founded the following year.

There are many historic places to visit in Boston, a partial list including the following: Boston Common, the site of the Boston Tea Party, Bunker Hill Monument, the U S Frigate Constitution at the Charlestown Navy Yard, Faneuil Hall—the Cradle of American Liberty, the First Church and Headquarters of the Christian Science Church, Benjamin Franklin's birthplace, the Granary Burying Ground, Old North Church, Old State House, Paul Revere's house, the Old South Meeting House, the Adams' houses, Longfellow's home, Plymouth, Concord, Lexington, Salem, Marblehead, Sleepy Hollow Cemetery, and Longfellow's Wayside Inn.



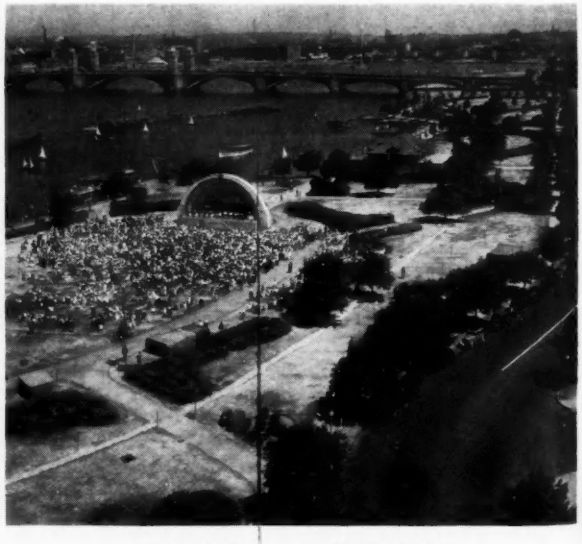
Old North Church

Paul Revere Mall

Bunker Hill Monument

Minute Man — Concord

Paul Revere House



Esplanade Concert — Hatch Shell

STREAM POLLUTION COMMITTEE BULLETIN

THERE will be a question and answer panel at the session on Stream Pollution of the National Convention, Friday morning, November 7th. Questions may be submitted by the audience on many phases of textile industrial waste disposal, including:

Legislation
Economics
Methods of Handling
Waste Analysis
Sources of Information

AATCC members may also submit questions in advance by mail to:

E A Leonard, Moderator
Convention Program on Stream Pollution
Alexander Smith, Inc
Yonkers 1, New York

Early submission will provide the program panel an opportunity for more thorough analysis and reply. All questions not verbally covered at the convention will be answered by mail through the AATCC Stream Pollution Committee.

OLNEY MEDAL AWARD LUNCHEON

ON Friday, November 7, at 12:30 P M in The Grand Ballroom, Hotel Statler, the Olney Medal will be awarded with appropriate ceremonies to—

Werner Von Bergen
Director of Research
Forstmann Woolen Company
Passaic, New Jersey

ENTERTAINMENT

THURSDAY and Friday evenings will be reserved for entertainment and relaxation from Convention affairs.

On Thursday evening, November 6, at 8:15 there will be a showing of the recent and popular motion picture, *"The Man in the White Suit"*—a fanciful and intriguing story of a young mill chemist who develops and makes the perfect fabric, represented to wear forever. A selected short, "Quality Control in Modern Merchandising," will also be shown.

On Friday evening, November 7, at 8:30 o'clock in the Grand Ballroom the famed Boston Symphony "Pops" Orchestra—sixty strong—will present a specially selected typical "Pops" Program. The registration fee includes a free ticket to this concert.

CONVENTION NOTES

RECEPTION

THE Northern New England Section extends to all Members and their Guests a hearty Welcome to the Convention.

The Reception and Registration Committees, readily distinguishable by their *Red* badge ribbons, and made up of members from each section, will cooperate in giving out information and extending courtesy.

At the Registration Desk there will be a card file giving the names of registrants and their hotel addresses during the Convention.

ALUMNI LUNCHEON

ON Saturday, November 8, at 1:00 P M in the Bay State Room, Hotel Statler, the Alumni Luncheon will provide Alumni of the various colleges an opportunity to meet with former classmates and fellow Alumni. Tables will be marked for each school. The following groups are actively participating:

Bradford Durfee Technical Institute
Charlotteville Institute of Textile Technology
Georgia Institute of Technology
Lowell Textile Institute
Massachusetts Institute of Technology
New Bedford Textile Institute
North Carolina State College
Philadelphia Textile Institute
Rhode Island School of Design

Outstanding Alumni and Officers from several institutions will make brief addresses. The Student Prize Paper Awards will also be made at this time.

ANNUAL BANQUET

WILLIAM H RUFFIN, President and Treasurer, Erwin Mills, Inc, Durham, North Carolina, will be Guest Speaker. A prominent man in the textile industry, he will have a message both interesting and entertaining.

Other attractive events will be The Intersectional Prize Paper Awards, the American Dyestuff Reporter Award and the President's Address.

AATCC Research Project——

THE ROLE OF SODIUM CHLORIDE AND SODIUM SULFATE IN ACID-DYEING WOOL

J DAVID JUSTICE* and WARREN W EWING

Lehigh University, Bethlehem, Pa

This investigation was undertaken to develop additional information and interest regarding the possibility of the general interchangeability of sodium sulfate and sodium chloride in the acid dyeing of wool.

A generous grant to AATCC from the International Salt Company, Inc, restricted only to the development of information of basic interest and usefulness to both textile and chemical industries, made possible a physical-chemistry project on the subject. The problem was assigned to the Lehigh University Research Institute, headed by Dr Harvey Neville. The research was carried out under the immediate supervision of Dr Warren Ewing, assisted by J David Justice.

AATCC conferences were arranged with a group of leading workers in this field from industrial and mill research laboratories in order to have available aspects of the problem from the industry viewpoint. The interest of this group is gratefully acknowledged and special appreciation is expressed to Dr G L Royer, H E Millson, H R McCleary and Dr E I Valko for their time and splendid cooperation.

H W STIEGLER
AATCC Director of Research

INTRODUCTION

SODIUM SULFATE has long been used as a leveling agent in acid-dyeing wool. This work was undertaken in order to determine the feasibility of using sodium chloride for this purpose. The laboratory results indicate that sodium chloride is a satisfactory leveling agent if a sufficient quantity is used. In some commercial-scale comparisons of the two salts, about four times as much sodium chloride as sodium sulfate was required in order to obtain the same levelness. Thus the question as to whether sodium chloride will be used in place of sodium sulfate *(7)* becomes an economic one. The ratio of the amount of sodium chloride to sodium sulfate needed to effect equal levelness is a function of many variables, such as affinity of dye, concentration of dye, concentration of salt, pH of solution, and liquor ratio. A modification of the Gilbert-and-Rideal equation has been proposed, from which the amount of salt necessary to give levelness can be calculated from initial concentrations. Values calculated from this equation have been compared with experimental results with satisfactory agreement.

LEVELNESS———The term "level" as applied to dyed wool has many interpretations. Most dyers would consider a wool fabric or yarn to be dyed level if all parts are of the same shade and color strength and, further, if all the single wool fibers are dyed the same to give a "solid shade". If the individual fibers are not dyed uniformly, the wool is said to be "skittery" in appearance and to exhibit poor fiber levelness, or to be fiber-unlevel *(1)*. For use in further discussion, we shall define "levelness", as used in this article, as follows: A fabric or yarn may be said to be dyed level when the dye is distributed throughout the entire piece of wool, so that true thermodynamic equilibrium exists. As we have not considered variations in the wool in this work, there are some situations in which a fabric would not be level by a dyer's standards but would be level according to the definition above. For example, the roots and tips of wool fiber may have different affinities for a dye, and at true equilibrium there may be a noticeable difference in the amount of dye adsorbed on these two portions of the wool. On the other hand, there can be different amounts of dye on different sections of a fabric (without regard to roots and tips). This situation frequently arises when the dye is quickly adsorbed on the first part of the fabric introduced into the dye bath, and thus the concentration of the dye in the bath is reduced to a point where it cannot dye the rest of the fabric so heavily. By our definition, and by any commonly accepted definition, such a fabric is not level. In addition, there is a difference between apparent equilibrium and the true thermodynamic equilibrium referred to in our definition. If the exhaustion of a dyebath is plotted against time, exhaustion levels off after a certain period of time, so that, as far as total dye adsorption is concerned, "equilibrium" has been reached. However, Millson, Watkins and Royer *(1)* have demonstrated that even on this level part of the curve, where no more dye will be adsorbed from solution, the fiber is not truly level because most of the dye may be deposited on the surface of the fiber, while the core is relatively undyed. In such a case as this, the dyed fabric might appear level to the eye, since the cores of the fibers are not visible, but the fabric would not be level by our definition. As the fiber remains in contact with the dye bath, a leveling action occurs and dye migrates to the center of the fiber.

THE NATURE OF LEVELING——— Having defined "levelness", we shall now consider the nature of the leveling process. The process of dye migrating from fiber to fiber and from portion to portion of the material being dyed is termed "leveling". It has long been known as an empirical observation that Glauber's salt, or sodium sulfate, is an effective leveling agent, that is, it promotes or makes easier this process of dye migration. It has also been observed that the presence of sodium sulfate in a dye bath reduces the final exhaustion of the dye from the bath so that more dye remains in solution. In order to illustrate our concept of the nature of the leveling process, we have set up in Figure 1 an idealized diagram of the process that takes place. Dye leaves the overdyed portion of the wool going into solution and dye goes from the solution onto the underdyed portion of the wool as illustrated in Figure 1A (underdyed and overdyed mean relative to equilibrium values). The solution acts as a medium for the transfer of dye from overdyed to underdyed sections. The magnitude of the concentration of the dye in solution is thus a

* Predoctoral Research Fellow under the sponsorship of the AATCC. The work presented here is part of a doctoral dissertation.

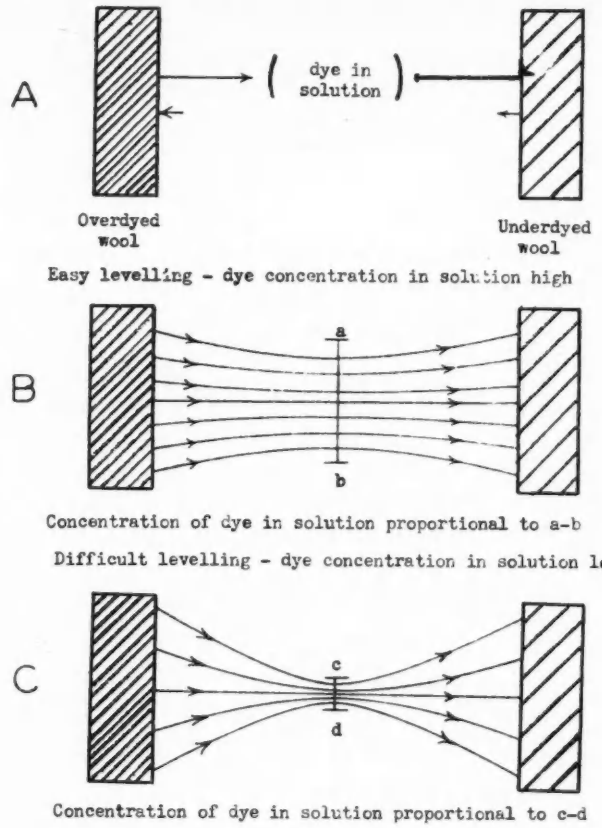


Figure 1
Nature of Leveling

measure of the ease of the leveling process. We can illustrate this transfer of dye with the two diagrams B and C in Figure 2. A low concentration of dye in solution can act as a bottleneck, inhibiting easy transfer of dye from one portion of the fabric to another while a high concentration of dye in the bath facilitates the transfer.

We shall then accept the concept of leveling action being a function of the concentration of dye in solution. The problem thus becomes one of measuring the effectiveness of the two salts in bringing about a high concentration of dye in solution, as a function of the other factors, which also influence final dye concentration in solution.

EXPERIMENTAL

METHODS———All dyes used in this work were purified by filtration, repeated precipitation with sodium acetate, and finally extraction of sodium acetate with alcohol, according to the method of Robinson and Mills *(2)*. The wool used was ordinary domestic territory-grade 64s, purified by the solvent extraction method, combed, drawn, spun, and made into skeins. It was finally ether-extracted forty-eight hours to remove the oil that had been added before combing. Allowance was made for the moisture content of the wool in determining the dry weight used in all calculations. The dyeing apparatus consisted of a glass rod with glass hooks, on which the sample was suspended in the dyebath. The glass rod oscillated through an angle of 90° about 150 times per minute. The concentration of dye was determined colorimetrically with a Coleman Universal Spectrophotometer, Model 11A, and pH was determined with a Beckman glass-electrode pH meter. All reagents were Baker's CP analyzed materials. Anhydrous sodium sulfate[1] was used throughout the work. All dyeings were carried out for four hours at 90°C. In several determinations of the time required to attain equilibrium, three hours appeared adequate, since there was no measurable change in the concentration of the dye in the dyebath during the next five hours. All results reported here were obtained by allowing four hours for attainment of equilibrium (See Figure 2).

EXPERIMENTAL RESULTS———In order to test the relative efficiences of sodium chloride and sodium sulfate as leveling agents, dyeing experiments were

(1) In early wool dyeing, hydrated sodium sulfate, popularly known as "Glauber's salt" (sodium sulfate decohydrate, $Na_2SO_4.10H_2O$; molecular weight, 322), was most commonly employed. Presently in America, however, although Glauber's salt is still available, the relatively much cheaper anhydrous sodium sulfate (Na_2SO_4; molecular weight, 142) has driven Glauber's salt out of the dyehouse. These two forms of sodium sulfate, if equally pure, give identical results in wool and other dyeing, provided 322 parts of Glauber's salt is used to do the work of 142 parts of anhydrous sodium sulfate, or about 2¼ times as much so as to make up for the useless water of crystallization contained in Glauber's salt. Since anhydrous sulfate is not now made from Glauber's salt, it is misleading to call it "anhydrous Glauber's salt"; it is absolutely wrong to call it simply "Glauber's salt".

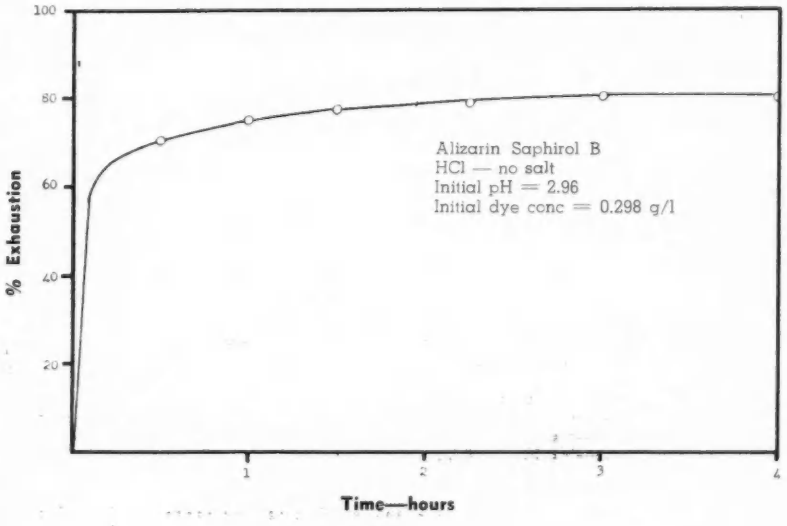


Figure 2
Rate of Attaining Equilibrium at 90°C

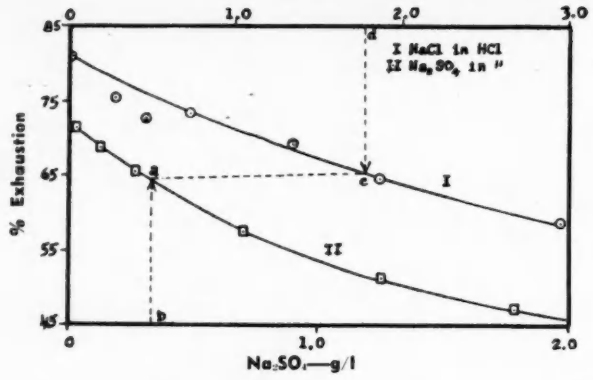


Figure 3
Alizarin Saphirol B (CI 1054)

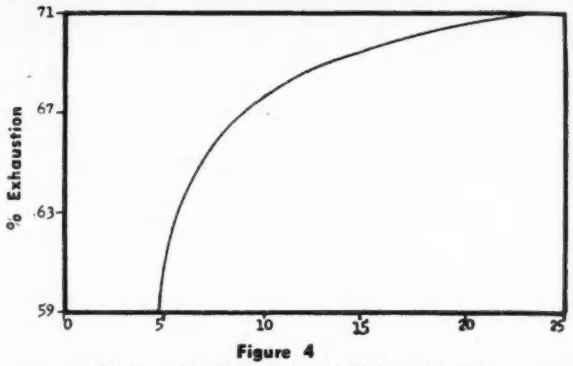


Figure 4
Ratio of NaCl to Na_2SO_4 (used with HCl and H_2SO_4 resp) required to obtain same equilibrium exhaustion. Calculated from Figure 3.

Figures 3 and 4: Original dye concn = 0.2977 g/l
Original pH = 2.96
Temperature = 90°C
Liquor ratio = 240 ml/g

carried out with the following dyes:

Alizarin Saphirol B (CI 1054)
Orange II (CI 151)
Orange G (CI 27)
Amido Naphthol Red G (CI 31)
Polar Yellow (CI 642)
Polar Red (CI 430)

The important factor to be determined was the amount of sodium chloride needed to obtain a certain distribution of dye between fiber and solution, compared with the amount of sodium sulfate needed under the same conditions of pH and temperature to effect the same distribution at equilibrium. Therefore, with other factors held constant, experiments were run with hydrochloric acid and different amounts of sodium chloride, and with sulfuric acid and different amounts of sodium sulfate. Results are plotted in Figures 3 to 14. The upper curve is for NaCl + HCl, the lower curve for Na_2SO_4 + H_2SO_4. In any figure they are both plotted on the same scale of exhaustion, but they are plotted on different scales of salt concentration. The scales for NaCl are along the top of the figures, those for Na_2SO_4 along the bottom. The interpretation of the curves is illustrated by extra lines and letters on Figure 3, which gives data for Alizarin Saphirol at a pH of 2.96, a dye concn of 0.298 grams per liter and a liquor ratio of 1:240, that is 240 ml of solution per gram of wool. The calculation of the ratio of $NaCl/Na_2SO_4$ is shown for one value of the exhaustion. Points a and c both represent 65% exhaustion, but only 0.266 grams/liter of Na_2SO_4 was needed for this value (as determined from point b), whereas 1.8 grams/liter of NaCl was required, as shown by point d. The ratio of 1.80/0.266 is 6.77, that is, 6.77 times as much NaCl as Na_2SO_4 is required to give an equilibrium exhaustion of 65%. The value of this ratio versus the exhaustion is shown in Figure 4. It varies from 5 to 25 in the range studied.

Figures 7 and 8 show the results for Orange II at a pH of 2.35, a dye concentration of 0.249 gram per liter and a liquor

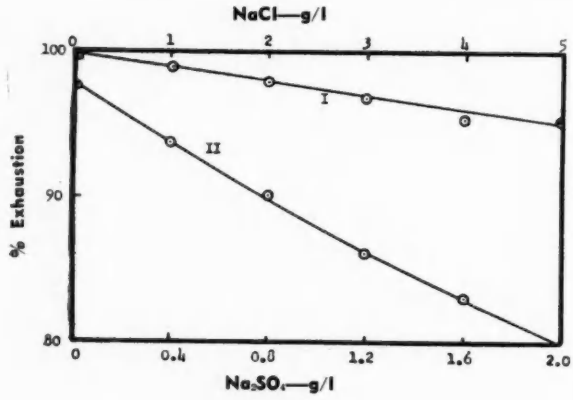


Figure 5
Alizarin Saphirol B (CI 1054)
I—NaCl in HCl
II—Na_2SO_4 in H_2SO_4

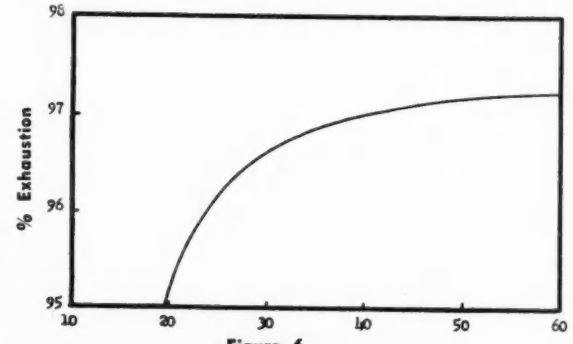


Figure 6
Ratio of NaCl to Na_2SO_4 (used with HCl and H_2SO_4 resp) required to obtain same equilibrium exhaustion. Calculated from Figure 5.

Figures 5 and 6: Original dye concn = 0.2977 g/l
Original pH = 2.35
Temperature = 90°C
Liquor ratio = 240 ml/g

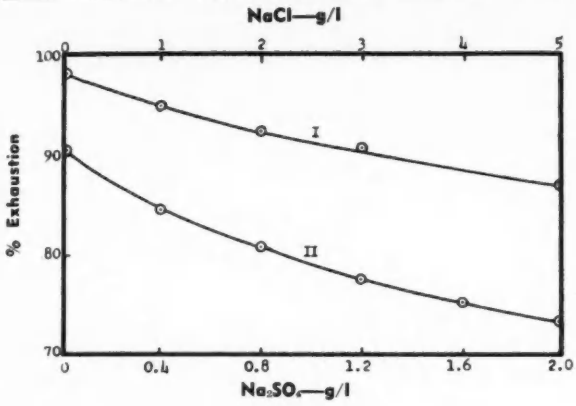


Figure 7
Orange II (CI 151)
I—NaCl in HCl
II—Na_2SO_4 in H_2SO_4

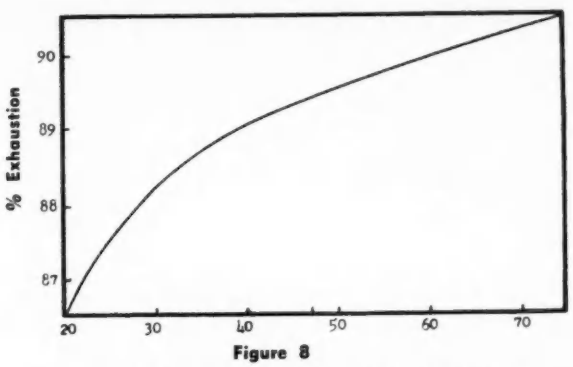


Figure 8

Ratio of NaCl to Na_2SO_4 (used with HCl and H_2SO_4 resp) required to obtain same equilibrium exhaustion. Calculated from Figure 7.

Figures 7 and 8: Original dye concn = 0.2493 g/l
Original pH = 2.35
Temperature = 90°C
Liquor ratio = 240 ml/g

ratio again of 1:240. The NaCl/Na_2SO_4 ratios for various percent exhaustions at equilibrium vary from 20 to 75.

Figures 9 and 10 show the results for Amido Naphthol Red G at a pH of 2.64, a dye concentration of 0.158 gram per liter and a liquor ratio of 1:240. The NaCl/Na_2SO_4 ratios, for various percent exhaustions at equilibrium, varies from 8 to 100. (The additional curve of Figure 9 will be discussed below.)

Figures 11 and 12 show the results for Orange G at a pH of 2.64, a dye concentration of 0.288 gram per liter and a liquor ratio of 1:240. The NaCl/Na_2SO_4 ratios for various percent exhaustions at equilibrium varied from 8 to 100.

Figures 13 and 14 show the results for Polar Yellow at a pH of 2.64, a dye concentration of 0.166 gram per liter and a liquor ratio of 1:240. The NaCl/Na_2SO_4 ratios for various percent exhaustions at equilibrium varied from 21 to 120.

One of the important conclusions that can be derived immediately from such graphs as Figures 3, 5, and 7 is that the high value of the ratio of NaCl to Na_2SO_4 is due primarily to the fact that the exhaustion for sulfuric acid without salt is lower than the exhaustion for hydrochloric acid without salt. This means that an exhaustion corresponding to that in pure sulfuric acid can be obtained with hydrochloric acid only by using an appreciable amount of salt. Thus in Figure 3, the amount of NaCl required to obtain

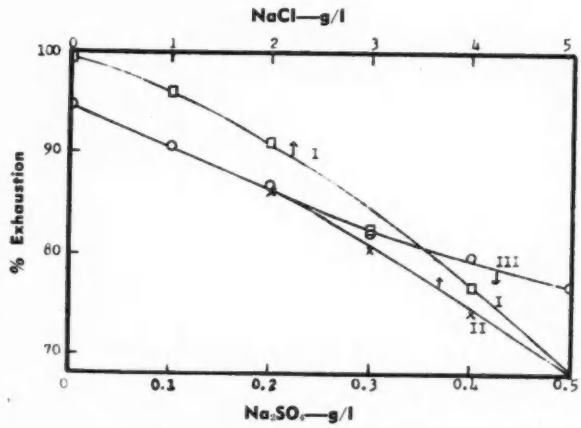


Figure 9
Amido Naphthol Red G (CI 31)
I—NaCl in HCl
II—NaCl in H_2SO_4
III—Na_2SO_4 in H_2SO_4

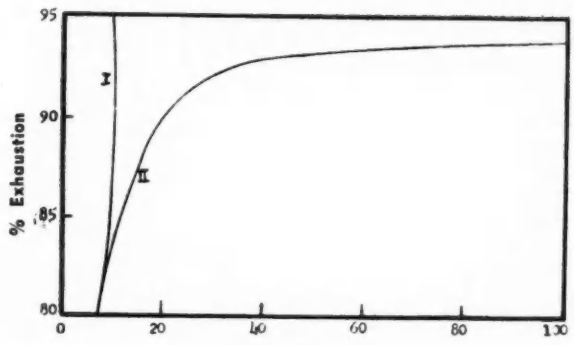


Figure 10

Ratio of NaCl to Na_2SO_4 required to obtain same equilibrium exhaustion. Calculated from Figure 9.
I—NaCl in H_2SO_4 compared with Na_2SO_4 in H_2SO_4
II—NaCl in HCl compared with Na_2SO_4 in H_2SO_4

Figures 9 and 10: Original dye concn = 0.1581
Original pH = 2.64
Temperature = 90°C
Liquor ratio = 240 ml/g

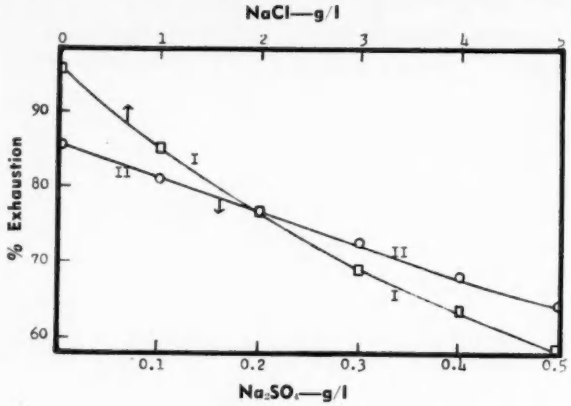


Figure 11
Orange G (CI 27)
I—NaCl in HCl
II—Na_2SO_4 in H_2SO_4

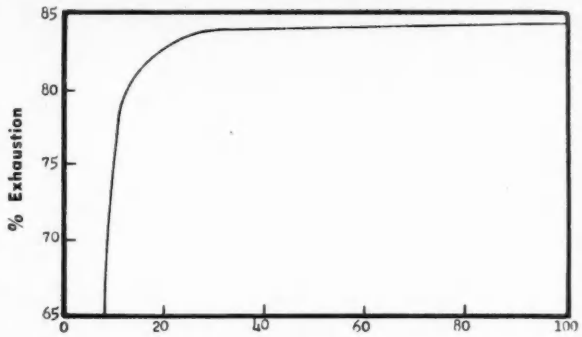


Figure 12

Ratio of NaCl to Na_2SO_4 (in HCl and H_2SO_4 resp) required to obtain the same equilibrium exhaustion. Calculated from Figure 11.

Figures 11 and 12: Original dye concn = 0.2877 g/l
Original pH = 2.64
Temperature = 90°C
Liquor ratio = 240 ml/g

an exhaustion equal to that obtained in salt-free sulfuric acid is 0.81 grams/liter. The ratio of 0.81 to zero is, of course, infinity. Each of the curves in Figures 4, 6, 8, etc will therefore approach infinity as the exhaustion approaches that in salt-free sulfuric acid. Therefore, the lower limit of the ratio is the important factor.

Theoretically, to determine the affinities of chloride and sulfate ions for wool fiber and to determine the effect of these affinities on the behavior of dyes of differing affinities, it is desirable to use NaCl with HCl so that the only anions are chloride and dye. The theoretical equations can be solved for more than two ions, but the mathematical calculations become more involved, and one also obtains a more clear-cut comparison of the two anions, chloride and sulfate, when each is used as the only inorganic anion in the dyebath.

From a practical point of view, however, the choice of acid is probably not critical. Therefore, in order to eliminate the effect of different pure acid exhaustions on the calculated ratio of NaCl/Na_2SO_4, a series was run with NaCl in H_2SO_4. Results are shown in Figure 9. There are three curves, the usual NaCl in HCl, and Na_2SO_4 in H_2SO_4, plus a curve for NaCl in H_2SO_4. For this dye the NaCl in HCl curve has a different shape from that obtained with any of the other dyes, and this fact merits further investigation. At very high values of salt concentration, the NaCl in HCl and NaCl in H_2SO_4 curves meet. The very large concentration of chloride ions present therefore makes the presence of sulfate ions obtained from the acid (in the second case) unimportant. The conventional plot of the ratio in Figure 10 has the usual shape, but the ratio of NaCl to Na_2SO_4 required if the acid is H_2SO_4 in each case

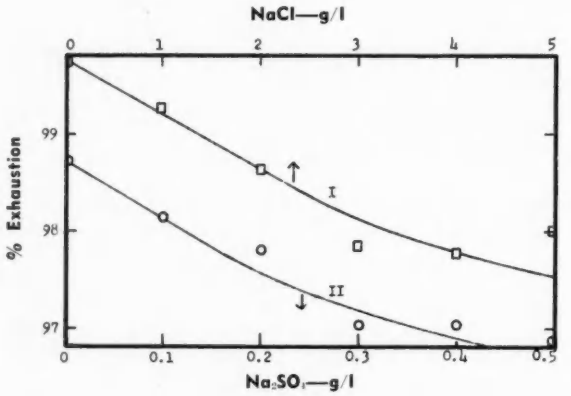


Figure 13
Polar Yellow (CI 642)
I—NaCl in HCl
II—Na_2SO_4 in H_2SO_4

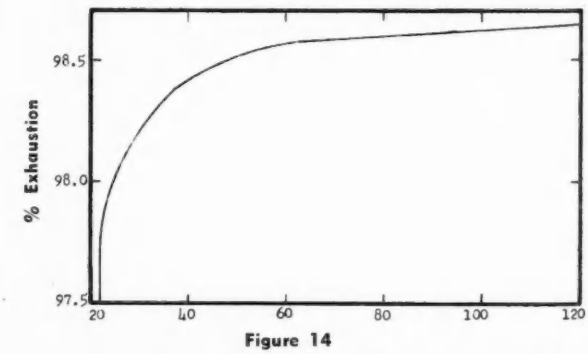


Figure 14

Ratio of NaCl to Na_2SO_4 (in HCl and H_2SO_4 resp) needed to obtain same equilibrium exhaustion. Calculated from Figure 13.

Figures 13 and 14: Original dye concn = 0.1656 g/l
Original pH = 2.64
Temperature = 90°C
Liquor ratio = 240 ml/g

is about 10 throughout the range. For the practical dyer, this ratio is probably most important.

A comparison of Figures 3 and 5 shows the importance of pH on the results obtained in this investigation. Two series of runs were made with Alizarin Saphirol; all variables were kept the same except that the pH was 2.96 in one case and 2.35 in the other. The more acid solution gave higher exhaustions and also larger NaCl/Na_2SO_4 ratios. All pH values in Figures 3 to 14 are initial values of the dyebath at 25°C before dyeing was carried out at 90°C.

The amount of dye displaced from the fiber by a salt is a function of the relative affinities of the two anions. It therefore follows that the effect of sodium chloride and sodium sulfate in displacing dye from fiber would be very much smaller in the case of a dye with high affinity, such as a milling dye. Some work was therefore carried out with Polar Red. Experimental data are plotted in Figures 15 and 16 as percent exhaustion vs pH at equilibrium. First, a series of experiments was carried out to determine the exhaustion in sulfuric acid over the range pH 4 to pH 6, Figure 16. A second series was run over the same pH range after adding sodium sulfate (2 grams per liter). The data show that sodium sulfate does not shift the percent exhaustion appreciably with this dye. The first series was repeated with hydrochloric acid in place of sulfuric acid. It was assumed that the presence of sodium chloride would shift the equilibrium curve even less, so a series of runs with sodium chloride over the pH run was not made, but, instead, four concentrations, 0.86, 3.43, 5.14, and 6.86 grams/liter, of sodium chloride were used in hydrochloric-acid dyebaths having pH values of approximately 6.2. The plotted data show that sodium chloride does not shift the equilibrium exhaustion in hydrochloric-acid baths.

Figures 3 to 14 have shown that salts tend to displace low-affinity dyes from wool, and presumably effect levelness by maintaining sufficient dye in solution to act as an exchange medium moving the dye from high- to low-concentration spots. Figures 15 and 16 show that sodium chloride and sodium sulfate are ineffective in displacing a high-affinity dye from the wool since the points in Figures 15 and 16 representing percent exhaustion versus pH fall approximately on the same curves whether or not salt is present in the acid.

The curves do indicate, however, that exhaustion can easily be suppressed by using a higher pH. In line with the idea that the role of a leveling agent is the maintenance of sufficient concentration of dye in the bath to enable transfer of dye

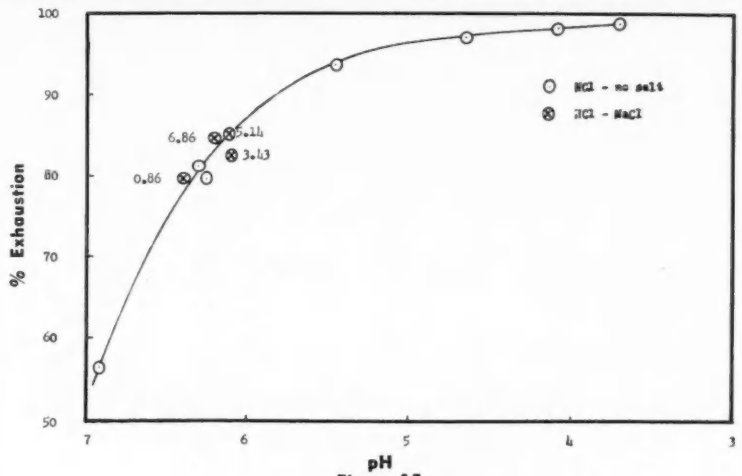


Figure 15
Polar Red—90°C
Figure beside crossed circle gives concentration of NaCl in g/l
Initial dye concentration = 0.213 g/l

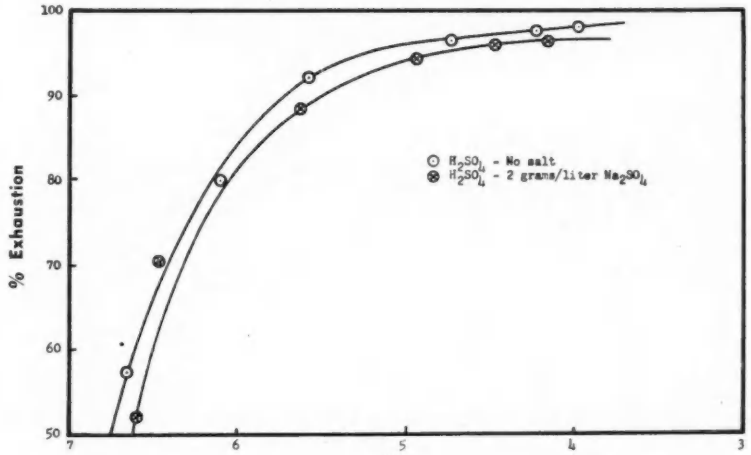


Figure 16
Polar Red—90°C

Initial dye concn = 0.205 g/l
Time = 4 hours

TABLE I

Expt	Fig	Colour Index Number	Salt	Acid	Initial Concentrations: Dye g/liter	Salt g/liter	Acid Normality	Initial pH	Percent Exhaustion of Dye
181C	3	1054	NaCl	HCl	0.2977	0	0.001030	2.96	80.9
185A	3	1054	NaCl	HCl	0.2977	2.944	0.001030	2.96	59.0
185B	3	1054	NaCl	HCl	0.2977	1.87	0.001030	2.96	64.5
185C	3	1054	NaCl	HCl	0.2977	1.356	0.001030	2.96	69.1
185D	3	1054	NaCl	HCl	0.2977	0.736	0.001030	2.96	73.7
185E	3	1054	NaCl	HCl	0.2977	0.468	0.001030	2.96	72.6
185F	3	1054	NaCl	HCl	0.2977	0.294	0.001030	2.96	75.5
183C	3	1054	Na_2SO_4	H_2SO_4	0.2977	1.782	0.000980	2.96	47.5
183D	3	1054	Na_2SO_4	H_2SO_4	0.2977	1.250	0.000980	2.96	51.
183E	3	1054	Na_2SO_4	H_2SO_4	0.2977	0.714	0.000980	2.96	57.6
183F	3	1054	Na_2SO_4	H_2SO_4	0.2977	0.267	0.000980	2.96	65.5
183G	3	1054	Na_2SO_4	H_2SO_4	0.2977	0.125	0.000980	2.96	68.5
183H	3	1054	Na_2SO_4	H_2SO_4	0.2977	0.0357	0.000980	2.96	71.7

(Continued on next page)

TABLE I (Concluded)

Expt	Fig	Colour Index Number	Salt	Acid	Initial Concentrations: Dye g/liter	Salt g/liter	Acid Normality	Initial pH	Percent Exhaustion of Dye
196A	5	1054	NaCl	HCl	0.2977	0	0.004239	2.35	99.75
196B	5	1054	NaCl	HCl	0.2977	5.000	0.004239	2.35	95.54
196C	5	1054	NaCl	HCl	0.2977	4.000	0.004239	2.35	95.48
196D	5	1054	NaCl	HCl	0.2977	3.000	0.004239	2.35	96.77
196E	5	1054	NaCl	HCl	0.2977	2.000	0.004239	2.35	97.85
196F	5	1054	NaCl	HCl	0.2977	1.000	0.004239	2.35	98.89
196G	5	1054	Na_2SO_4	H_2SO_4	0.2977	0	0.004507	2.35	97.65
196H	5	1054	Na_2SO_4	H_2SO_4	0.2977	2.000	0.004507	2.35	80.2
196I	5	1054	Na_2SO_4	H_2SO_4	0.2977	1.600	0.004507	2.35	83.2
196J	5	1054	Na_2SO_4	H_2SO_4	0.2977	1.200	0.004507	2.35	86.2
196K	5	1054	Na_2SO_4	H_2SO_4	0.2977	0.800	0.004507	2.35	90.1
196L	5	1054	Na_2SO_4	H_2SO_4	0.2977	0.400	0.004507	2.35	93.7
190B	7	151	NaCl	HCl	0.2493	0	0.004239	2.35	98.25
190C	7	151	NaCl	HCl	0.2493	5.000	0.004239	2.35	86.6
190D	7	151	NaCl	HCl	0.2493	4.000	0.004239	2.35	88.6
190E	7	151	NaCl	HCl	0.2493	3.000	0.004239	2.35	90.6
190F	7	151	NaCl	HCl	0.2493	2.000	0.004239	2.35	92.3
190G	7	151	NaCl	HCl	0.2493	1.000	0.004239	2.35	94.9
190H	7	151	Na_2SO_4	H_2SO_4	0.2493	0	0.004507	2.35	90.9
190I	7	151	Na_2SO_4	H_2SO_4	0.2493	2.000	0.004507	2.35	73.3
190J	7	151	Na_2SO_4	H_2SO_4	0.2493	1.600	0.004507	2.35	75.1
190K	7	151	Na_2SO_4	H_2SO_4	0.2493	1.200	0.004507	2.35	77.5
190L	7	151	Na_2SO_4	H_2SO_4	0.2493	0.800	0.004507	2.35	80.8
190M	7	151	Na_2SO_4	H_2SO_4	0.2493	0.400	0.004507	2.35	84.5
209A	9	31	Na_2SO_4	H_2SO_4	0.1581	0	0.002285	2.64	94.7
209B	9	31	Na_2SO_4	H_2SO_4	0.1581	0.100	0.002285	2.64	90.6
209C	9	31	Na_2SO_4	H_2SO_4	0.1581	0.200	0.002285	2.64	86.7
209D	9	31	Na_2SO_4	H_2SO_4	0.1581	0.300	0.002285	2.64	83.7
209E	9	31	Na_2SO_4	H_2SO_4	0.1581	0.400	0.002285	2.64	79.8
209F	9	31	Na_2SO_4	H_2SO_4	0.1581	0.500	0.002285	2.64	76.8
209G	9	31	NaCl	H_2SO_4	0.1581	0	0.002285	2.64	94.4
209H	9	31	NaCl	H_2SO_4	0.1581	1.000	0.002285	2.64	90.5
209I	9	31	NaCl	H_2SO_4	0.1581	2.000	0.002285	2.64	86.1
209J	9	31	NaCl	H_2SO_4	0.1581	3.000	0.002285	2.64	80.4
209K	9	31	NaCl	H_2SO_4	0.1581	4.000	0.002285	2.64	74.1
209L	9	31	NaCl	H_2SO_4	0.1581	5.000	0.002285	2.64	68.2
209M	9	31	NaCl	HCl	0.1581	0	0.002091	2.64	99.53
209N	9	31	NaCl	HCl	0.1581	1.000	0.002091	2.64	96.0
209O	9	31	NaCl	HCl	0.1581	2.000	0.002091	2.64	91.0
209P	9	31	NaCl	HCl	0.1581	3.000	0.002091	2.64	82.3
209Q	9	31	NaCl	HCl	0.1581	4.000	0.002091	2.64	76.7
209R	9	31	NaCl	HCl	0.1581	5.000	0.002091	2.64	68.1
209S	11	27	Na_2SO_4	H_2SO_4	0.2877	0	0.002285	2.64	85.6
209T	11	27	Na_2SO_4	H_2SO_4	0.2877	0.100	0.002285	2.64	80.8
209U	11	27	Na_2SO_4	H_2SO_4	0.2877	0.200	0.002285	2.64	76.7
209V	11	27	Na_2SO_4	H_2SO_4	0.2877	0.300	0.002285	2.64	72.5
209W	11	27	Na_2SO_4	H_2SO_4	0.2877	0.400	0.002285	2.64	68.0
209X	11	27	Na_2SO_4	H_2SO_4	0.2877	0.500	0.002285	2.64	65.0
209Y	11	27	NaCl	HCl	0.2877	0	0.002091	2.64	95.5
209Z	11	27	NaCl	HCl	0.2877	1.000	0.002091	2.64	84.7
209AA	11	27	NaCl	HCl	0.2877	2.000	0.002091	2.64	76.5
209AB	11	27	NaCl	HCl	0.2877	3.000	0.002091	2.64	68.7
209AC	11	27	NaCl	HCl	0.2877	4.000	0.002091	2.64	63.5
209AD	11	27	NaCl	HCl	0.2877	5.000	0.002091	2.64	58.0
212M	13	642	Na_2SO_4	H_2SO_4	0.1656	0	0.002285	2.64	98.73
212N	13	642	Na_2SO_4	H_2SO_4	0.1656	0.100	0.002285	2.64	98.13
212O	13	642	Na_2SO_4	H_2SO_4	0.1656	0.200	0.002285	2.64	97.79
212P	13	642	Na_2SO_4	H_2SO_4	0.1656	0.300	0.002285	2.64	97.04
212Q	13	642	Na_2SO_4	H_2SO_4	0.1656	0.400	0.002285	2.64	97.04
212R	13	642	Na_2SO_4	H_2SO_4	0.1656	0.500	0.002285	2.64	96.89
212S	13	642	NaCl	HCl	0.1656	0	0.002091	2.64	99.76
212T	13	642	NaCl	HCl	0.1656	1.000	0.002091	2.64	99.25
212U	13	642	NaCl	HCl	0.1656	2.000	0.002091	2.64	98.61
212V	13	642	NaCl	HCl	0.1656	3.000	0.002091	2.64	97.82
212W	13	642	NaCl	HCl	0.1656	4.000	0.002091	2.64	97.76
212X	13	642	NaCl	HCl	0.1656	5.000	0.002091	2.64	98.00
308A	15	430	NaCl	HCl	0.2127	0	0	(7)*	56.5
308B	15	430	NaCl	HCl	0.2127	0	0.000279	(3.60)*	79.8
308C	15	430	NaCl	HCl	0.2127	0	0.000558	(3.20)*	93.0
308D	15	430	NaCl	HCl	0.2127	0	0.000827	(3.06)*	97.3
308E	15	430	NaCl	HCl	0.2127	0	0.001116	(2.95)*	98.4
308F	15	430	NaCl	HCl	0.2127	0	0.001395	(2.85)*	98.8
314B	15	430	NaCl	HCl	0.2127	0.86	0.000299	(6.4)*	79.8
314D	15	430	NaCl	HCl	0.2127	3.43	0.000299	(6.1)*	82.5
314E	15	430	NaCl	HCl	0.2127	5.14	0.000299	(6.1)*	85.1
314F	15	430	NaCl	HCl	0.2127	6.86	0.000299	(6.2)*	84.5
317A	16	430	Na_2SO_4	H_2SO_4	0.205	0	0	(6.65)*	57.4
317B	16	430	Na_2SO_4	H_2SO_4	0.205	0	0.000305	(6.1)*	80.0
317C	16	430	Na_2SO_4	H_2SO_4	0.205	0	0.000610	(5.57)*	92.0
317D	16	430	Na_2SO_4	H_2SO_4	0.205	0	0.000915	(4.70)*	96.40
317E	16	430	Na_2SO_4	H_2SO_4	0.205	0	0.001220	(4.20)*	97.56
317F	16	430	Na_2SO_4	H_2SO_4	0.205	0	0.001525	(3.87)*	97.95
317G	16	430	Na_2SO_4	H_2SO_4	0.205	2.000	0	(6.6)*	51.6
317H	16	430	Na_2SO_4	H_2SO_4	0.205	2.000	0.000305	(6.47)*	70.2
317I	16	430	Na_2SO_4	H_2SO_4	0.205	2.000	0.000610	(5.61)*	88.5
317J	16	430	Na_2SO_4	H_2SO_4	0.205	2.000	0.000915	(4.91)*	94.02
317K	16	430	Na_2SO_4	H_2SO_4	0.205	2.000	0.001220	(4.44)*	95.83
317L	16	430	Na_2SO_4	H_2SO_4	0.205	2.000	0.001525	(4.11)*	96.16

NOTE: Concentrations are values at 25°C. For use in the equations, appropriate allowances were made for the expansion of the water. The values of pH were determined at 25°C. Those values marked * and included in parenthesis are final, not initial, values. The structures of the dyes are given in the Colour Index.

from one spot on the wool to another, it would appear that more level dyeing of this dye can be obtained at higher pH values. It is a well-known empirical fact that most milling dyes are applied from buffered solutions with a relatively high pH. The query then arises as to whether any sodium sulfate is necessary in such a bath since the exhaustion of the dye from the bath has been reduced by reducing the acidity. There will therefore be sufficient dye in the bath to act as a transfer medium from overdyed to underdyed portions of the fabric, whether a salt is present or not.

Data on the experiments discussed are summarized in Table I.

COMMERCIAL RESULTS

The experimental results discussed above, and the theoretical predictions discussed below appear to indicate that sodium chloride would be as effective a leveling agent as sodium sulfate, if used in larger amounts. A series of tests on a commercial scale was arranged by a special AATCC committee concurrently investigating the applied aspects of the project *(7)*.

Six mill runs were made at the Merrimac Woolen Mills in Dracut, Massachusetts, to compare the actions of sodium chloride and sodium sulfate in dyeing wool.

Four runs (I, II, V, and VI) were made with a standard mixture of four commercial dyes. These dyes were of medium affinity, and the dyeing was carried out with sufficient acetic acid to give pH values varying from about 3 at the start of the run to about 4.5 at the end. Two runs (III, IV) were made with a standard mixture of three commercial dyes, which had to be applied in an approximately neutral bath, buffered with ammonia and acetic acid. It was concluded that sodium chloride is as effective as sodium sulfate in leveling action, if a somewhat greater amount of sodium chloride is used.

Figures 17 and 18 illustrate the important results of the mill runs by showing the amount of dye held off the fabric by various amounts of the two salts. It would appear from Figure 17 that 10% sodium sulfate (I) is more effective than 10% sodium chloride (VI), but less effective than 40% sodium chloride (II). All three of these fabrics were level, as judged by regular mill inspectors. The run without salt (V), however, was very unlevel, and illustrated the necessity of having some leveling agent.

The dyes used in these four runs (I, II, V, VI) are normally easy to dye level. Runs III and IV (Figure 18) were made with 10% sodium sulfate and 40% sodium chloride, respectively, with colors nor-

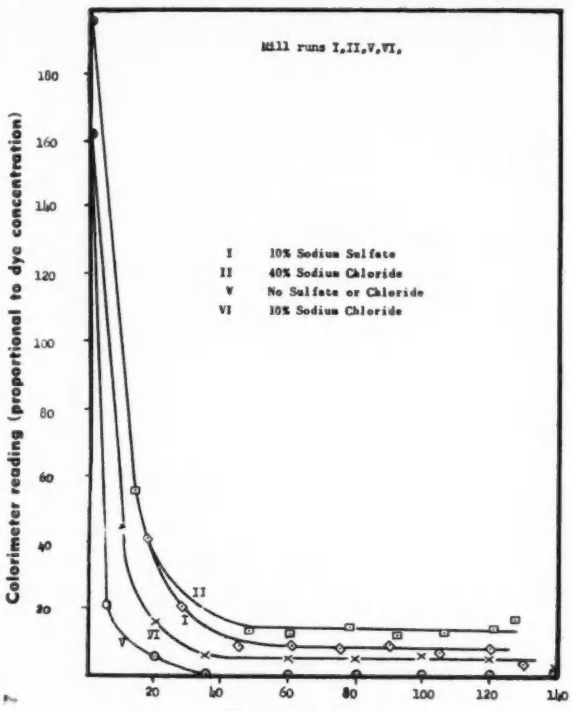


Figure 17
Mill Runs I, II, V, VI

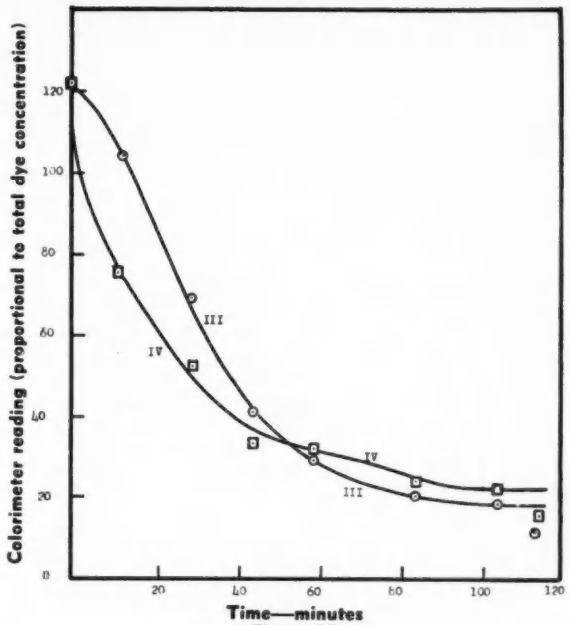


Figure 18
Mill Runs III, IV
Run III—10% Na_2SO_4
Run IV—40% NaCl

mally difficult to level. Both these fabrics were unlevel. The fabric dyed with sodium chloride was, if anything, somewhat more level than the sample dyed with sodium sulfate.

From the fact that these fabrics were unlevel, even though applied at a high pH, we would conclude that they are high-affinity dyes. From the discussion above about high-affinity dyes, we conclude that neither sodium sulfate nor sodium chloride would effect an appreciable displacement of the dye from the fiber. Figure 18 shows that we are unable to conclude that 40% sodium chloride is either more, or less, effective than 10% sodium sulfate, since the curves cross each other.

The runs were standard dyeings carried out in 4-ft stainless-steel dye kettles. The kettles were heated by passing steam into the dye liquor, so that the volume of liquor increased during the run because of condensation. Samples of liquor and fabric were taken periodically.

The pH of the liquor samples was determined with a Beckman glass-electrode pH meter.

COMPARISON OF THEORY AND EXPERIMENT

In the preceding section we have reported a purely experimental comparison of the relative effectiveness of sodium chloride and sodium sulfate in displacing dye from a wool fiber and have interpreted these results as a measure of their relative efficiencies as leveling agents. In the following discussion we compare experimental results with theoretical predictions of the displacing power of these two salts. The theory is used to calculate percent exhaustion versus grams per liter of sodium chloride added, and percent exhaustion versus grams per liter of sodium sulfate added. These calculated values are in excellent agreement with experimentally observed values in three out of four cases and in good agreement in the fourth case. A very good correlation between theory and experiment having been

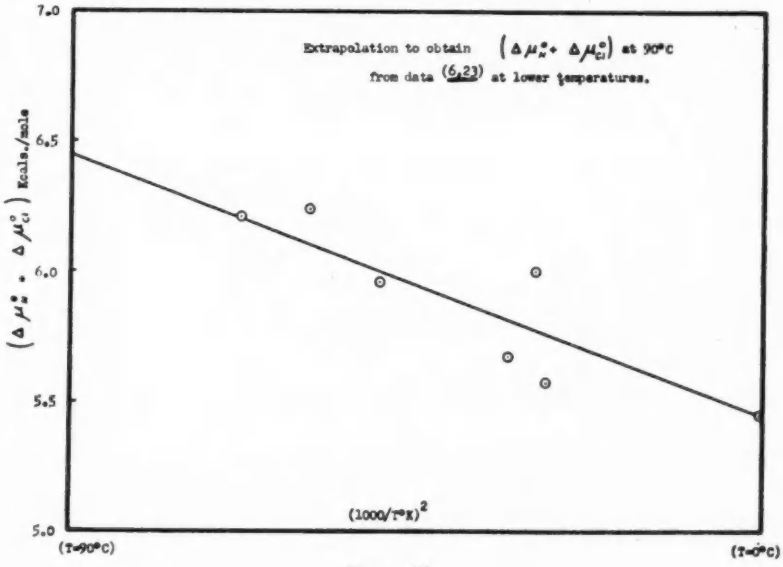


Figure 19

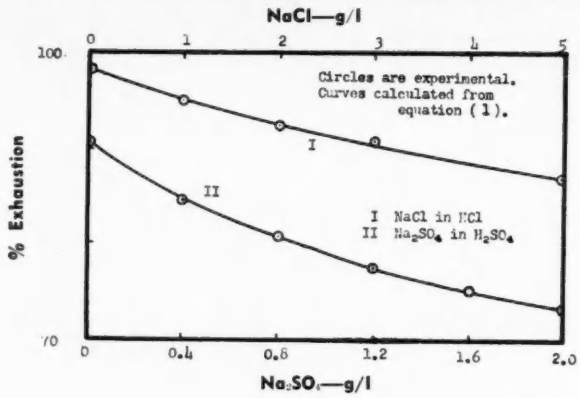


Figure 20
Orange II

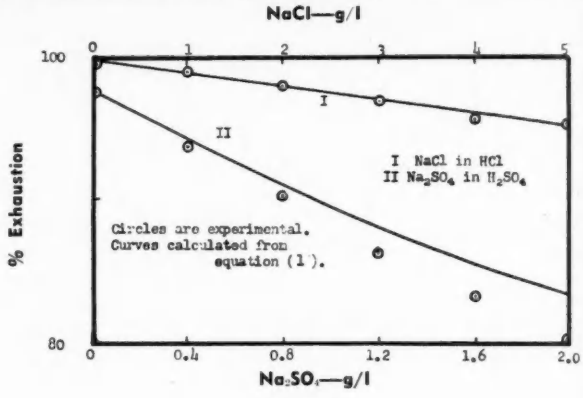


Figure 21
Alizarine Saphirol 3

established, it is then possible to use the theory as an indication of the influence that various factors have in determining the amount of sodium chloride needed to achieve the same result as a given amount of sodium sulfate. These factors are the following: affinity constant, B (defined below), for the dyes; initial concentrations of acid, dyes, and salt; and liquor ratio. The way in which these factors influence the amount of sodium chloride needed is discussed below, after a presentation of the theory.

Gilbert and Rideal *(3)* have derived a thermodynamic equation for the adsorption of ions from solution. Their equation relates the amount of an ion on a fiber to the amount in solution at equilibrium. From a dyer's point of view, it is more useful to relate the equilibrium concentration of dye in the bath (the important factor in leveling) to the initial (rather than final) concentrations of all the dyebath ingredients. We have therefore set the Gilbert and Rideal equation up in a general form for determining equilibrium concentrations from initial concentrations, and the affinity constants. It is assumed that the only cation adsorbed, in the acid region, is the hydrogen ion. This assumption appears to be perfectly valid in the acid region, but a case where it does not apply is considered later. The equation is

$$1 = \sum_{k} \left(\frac{a'_k}{\left(\frac{\theta_H}{1-\theta_H}\right)^{z+1} \frac{B_k}{(a'_H - \theta_H)^z} + \frac{\alpha}{z}\theta_H} \right) \qquad (1)$$

where k = subscript referring to any anion, dye or salt, of any valence. The summation is carried out over all anions in solution.

a'_k, a'_H = initial activities (approximately equal to concentrations) of anions and hydrogen ions, respectively.

θ_H = a fraction, the amount of hydrogen ion adsorbed divided by the maximum amount that can be adsorbed. The maximum adsorbable is 0.833 milliequivalents per gram, = m.

α = m/R where R = liquor ratio in liters/gram = 0.240 in our work.

z = valence of anion k.

$B_k = e^{\frac{z\Delta\mu^\circ_H + \Delta\mu^\circ_k}{RT}}$

$\Delta\mu^\circ$ = the difference in chemical potential of the ion on the fiber and in solution when it is in the standard state in each phase. The original article *(3)* should be consulted for a precise explanation of the appearance of this very important term in the final equation.

R = the gas constant, 1.986 cals/mole/degree.

T = the absolute temperature.

The equation is solved by choosing arbitrary values for θ_H and substituting in the equation until a value which satisfies the equation is obtained. The value of θ_k is then determined by multiplying the value of the term in brackets by the θ_H which satisfies equation 1. Thus the amount of each anion adsorbed at equilibrium can be determined from the initial composition of the dyebath. From the initial dye concentration and the amount of dye adsorbed, the concentration of the dye in the bath at equilibrium can be readily calculated as a measure of the leveling tendencies (see Figure 1).

This equation can also be used to calculate the value of the constant B for anions from data of the type used in Figures 3, 5, 7, 9, 11, and 13. This calculation will be illustrated for one monovalent dye, Orange II, and one divalent dye, Alizarin Saphirol B, and for the chloride and sulfate ions, from the data of Figures 7 and 5. It is, of course, theoretically possible to calculate the most satisfactory value for B for each of the four anions from the data by using a least-squares method. The work involved in applying the least-squares method to such a complex equation, which must be solved by a method of successive approximations in the first place, is almost prohibitive. In our calculations we used a value of B for the chloride ion, obtained by extrapolating from data available *(4, 5)* at temperatures of 0° to 60°C, to 90°C, the temperature of our experiments. The extrapolation is not very satisfactory, as is shown by Figure 19, in which the value of $(\Delta\mu^\circ_H + \Delta\mu^\circ_{Cl})$, calculated from pH of ½ maximum combination for hydrochloric acid, is plotted against the reciprocal of the square of the absolute temperature. The pH of ½ maximum combination, denoted by $pH_{½}$, is related to $(\Delta\mu^\circ_H + \Delta\mu^\circ_{Cl})$ by

$$10^{-pH_{½}} = e^{\left(\frac{\Delta\mu^\circ_H + \Delta\mu^\circ_{Cl}}{2RT}\right)} \qquad (2)$$

From this extrapolation we obtained a value of 1.268×10^{-4} for B_{Cl} for the chloride ion. It should be noted that the value of B for any anion in the system we have set up depends on the sum of the $\Delta\mu^\circ$s for the anion and z (the valence of the anion) times the value of $\Delta\mu^\circ$ for the hydrogen ion. Thus, we are not faced with the problem of determining absolute values for individual ions.

From the experimental data for initial and final Orange II concentrations, θ_2 was calculated for each experiment, where the subscript 2 refers to the Orange II anion and 1 to the chloride ion. We now have the relationships:

$$\theta_H = \theta_2 + \theta_1 \qquad (3)$$

and

$$1 = \frac{\alpha'_1}{\dfrac{\theta_H}{(1-\theta_H)^2}\dfrac{B_1}{(a'_H - \alpha\theta_H)} + \alpha} \qquad (4)$$

Various values of θ_H were selected for each experiment, and θ_1 calculated from equation 4 using $B_1 = 1.268 \times 10^{-4}$ until the proper value was found, which also satisfied equation 3. When θ_H and θ_1 had been determined in this manner, B_2 was calculated from:

$$\theta_2 = \frac{a'_2}{\dfrac{\theta_H}{(1-\theta_H)^2}\dfrac{B_2}{(a'_H - \alpha\theta_H)} + \alpha} \qquad (5)$$

The values obtained are summarized in Table II.

From these data, the value of B_2 chosen was 3.09×10^{-7}, obtained by choosing a value intermediate between those obtained by averaging the logarithms and the average of the values of B.

From this average value of B we can calculate $\Delta\mu^\circ_H + \Delta\mu^\circ_2 = -10{,}800$ cals/mole, which is close to the value of −10,300 determined by Meggy *(6)* at 60°C.

From the value of B_1 selected as described and from this average B, the curve of percent exhaustion versus grams of added sodium chloride was calculated. This curve is the upper curve in Figure 21. The experimental values are shown as circles on the graph. (They are the same as those shown in Figure 7). The agreement of theory and experiment was excellent.

From the average value of B_2, the value of B_4 for the sulfate ion was calculated from experimental data for percent exhaustion of Orange II versus the amount of sodium sulfate added. The results are summarized in Table III. This method of calculation was similar to that used for the calculation of B_2 with the value of B_1 and experimental data.

The average of values for experiments 190I to 190M inclusive is −8.232, and the average deviation is 0.013. The value obtained in experiment 190H deviates 0.139 from this average and thus we are justified in ignoring it. The value of B_4 is thus 5.86×10^{-9}. From this value of B_4 the bottom curve in Figure 20 was calculated for percent exhaustion of Orange II versus amount of sodium sulfate added. Again, the agreement of theory and experiment is excellent.

The value of B_5 was calculated, by similar methods, for Alizarin Saphirol B. The same value of B_1 was used and B_5 was calculated from the experimental data. The results are summarized in Table IV.

It proved impossible to obtain a value of B_5 in the case of experiment 196A, pure acid, because the chloride ion in solution, due only to the acid, was so small in amount, and its effect in reducing the exhaustion of the high affinity dye so negligible, that a value for B_5 could not be determined. The other values all show very satisfactory consistency. The upper curve in Figure 21 was calculated with this value of B_5 and the extrapolated value of B_1 discussed above. Again, we have excellent agreement of theory and experiment.

The value of B_4 for sulfuric acid, determined from the Orange II experiments as described, and the value of B_5 for Alizarin Saphirol B were used to calculate the lower curve in Figure 21. Here the agreement between theory and experiment is not nearly so good. It should be remembered, however, that an extrapolated value of B_1 for hydrochloric acid was used to calculate B_2 for Orange II, and that this value of B_2 was then used to calculate B_4 for sulfuric acid. This value of B_4 was then used to calculate percent exhaustion for Alizarin Saphirol B in the presence of sodium sulfate. We have by this time stretched out pretty far from our basis of reference, the rather unsatisfactorily determined ($\Delta\mu^\circ_H + \Delta\mu^\circ_{Cl}$). We should probably be surprised at the excellent agreement we get in the first three cases rather than the lack of agreement in the last curve discussed.

A study of equation (1) shows the way in which pH, liquor ratio, initial concentration of dye, and affinity constant of dye influence the amount of sodium chloride needed to replace a given amount of sodium sulfate as a leveling agent. In this discussion it is assumed that the amount of sodium sulfate needed to achieve satisfactory leveling in a given dyebath is known, and that it is desired to know how much sodium chloride should be used as a direct substitute for the sodium sulfate without otherwise changing the composition of the dyebath.

TABLE II

Experiment	$\bar{r}_2$	$\bar{r}_H$	log B_2
190B	.2014	.3321	−6.562
190G	.1945	.4630	−6.508
190F	.1892	.5179	−6.493
190E	.1858	.5528	−6.512
190D	.1817	.5779	−6.504
190C	.1768	.5962	−6.472

TABLE III

Experiment	$\bar{r}_1$	$\bar{r}_H$	log B_4
190H	.1864	0.5474	−8.093
190M	.1732	0.6234	−8.210
190L	.1657	0.6534	−8.219
190K	.1589	0.6755	−8.244
190J	.1540	0.6896	−8.247
190I	.1503	0.6993	−8.238

TABLE IV

Experiment	$\bar{r}_5$	$\bar{r}_H$	log B_5
196A	.3607	.4338	.....
196F	.3576	.5232	−10.313
196E	.3539	.5699	−10.288
196D	.3500	.5996	−10.276
196C	.3449	.6209	−10.246
196B	.3448	.6388	−10.350

CONCLUSIONS

pH: For dyebaths in which the initial concentration of acid is high, a greater amount of sodium chloride is needed than for dyebaths in which there is a low initial acid concentration (high pH). (This relationship, based on the theoretical equation, has qualitative experimental verification in Figures 4 and 6).

liquor ratio: At higher liquor ratios, the amount of sodium chloride needed to replace directly a given amount of sodium sulfate is less.

initial dye concentration: At lower initial dye concentrations, a smaller amount of sodium chloride can be used to replace directly a given amount of sodium sulfate.

affinity constant of the dye: As mentioned above, for dyes of very high affinity, neither sodium chloride nor sodium sulfate displace sufficient dye from wool to effect levelness. In such cases, it is necessary to carry out the dyeing at higher pH values, usually in buffered solutions, in order to achieve levelness. For dyes of lower affinity, which can be controlled by using salts, the lower the affinity, the smaller the amount of sodium chloride needed for a direct replacement of sodium sulfate.

ACKNOWLEDGMENTS

The authors are indebted to the American Association of Textile Chemists and Colorists for the financial support of this program, and to G L Royer and his associates at the Calco Chemical Division of American Cyanamid Company for supplying the dyes and for many valuable suggestions.

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AATCC Research Project——

INTERCHANGEABILITY OF SODIUM SULFATE AND COMMON SALT IN ACID-DYEING WOOL*

HAROLD W LEITCH, *Chairman*

AATCC Research Committee on the Chemical Technology of Wool

Existing information concerning the interchangeability of sodium sulfate and common salt in acid-dyeing wool was meager, unco-ordinated and confusing. The following applied investigation was directed toward full-scale mill-processing evidence concerning the possibility of satisfactory interchangeability of the two salts.

Carefully chosen dyes and procedures were planned to illustrate level, unlevel and intermediate degrees of levelness. On the basis of laboratory and small-kettle experimentation, sufficient evidence was accumulated to warrant full-scale mill trials under close supervision and observation. These were finally substantiated by dyeing the entire production of a mill for three months with common salt instead of sodium sulfate.

The work was done concurrently with, but independent of, a theoretical investigation.

The evidence indicates that approximately four times as much common salt as anhydrous sulfate is needed as a leveling agent in acid-dyeing wool.

** To answer the question of the interchangeability of sodium sulfate and common salt in acid-dyeing wool, an applied research independent of the physical-chemistry investigation financed by International Salt Company, Inc, was simultaneously carried out by a specially appointed group of leading chemists from the wool industry in the New England area:*

Harold W Leitch, Chairman
Hugh Christison
Leslie Christison
John N Dalton
Roland E Derby
Alex Morrison
Clarence L Nutting
Frederic A Prisley
John H Skinkle

The results of this applied investigation are given in the paper before you.

Gratitude and appreciation are expressed to Chairman Leitch and members of this competent and well qualified task force for great interest and unstinted personal time devoted to this project. Special acknowledgment is due also to Mr Derby of the Derby Company for his generous contribution to the Association of much laboratory work and for making possible the placing of the entire production of the Merrimack Woolen Mills on common-salt dyeing formulas for a period of more than three months; to Messrs Hugh Christison and Clarence Nutting of the Arlington Mills for small-kettle and preliminary full-scale mill runs; to the American Woolen Company and Pacific Mills for the vital assistance and co-operation of their staff members on this committee; to the International Salt Company for co-operation and materials.

H W STIEGLER,
AATCC Director of Research

INTRODUCTION

SATISFACTORY interchangeability of sodium sulfate and common salt (sodium chloride) as leveling agents in dyeing wool with acid colors has been debatable for a long time. Opinions varied greatly among dyers and textile chemists. Conclusions were generally based on individual experience, usually restricted in scope and evidence. Apparently only scattered efforts were made, or at least published, with respect to elimination of variables or to carefully conducted, observed and recorded experiments. Laboratory results were not readily available, and practically no supporting evidence was at hand with regard to the comparison of these two salts in full-scale mill dyeing of wool. In the few cases where mill runs had been made there were too many variables and gaps in the evidence to permit conclusions to be drawn.

The textile industry has a vital stake in all information concerning the possible interchangeability of common salt and sodium sulfate for certain purposes, not only from the technical viewpoint but from the economic viewpoint of costs and shortages of one or the other of the salts.

When AATCC plans were organized for physical-chemical investigations on the role of sodium sulfate and sodium chloride in the acid dyeing of wool*, simultaneous plans were made for applied research from the viewpoint of practical, full-scale mill dyeing. These plans for mill dyeings were independent of the theoretical investigation and were drawn up by a team of experts from the wool industry to insure proper consideration of the practical application features involved.

PRELIMINARY LABORATORY WORK

Prior to actual mill runs, a large amount of laboratory work was done, including dyeings made in small kettles accommodating about one yard of worsted cloth. Later, sample-kettle runs were made in the mill, and, finally, full-scale mill runs.

To provide a starting point for discussion and agreement with respect to *level* and *unlevel* dyeing characteristics, self-shades of the following dyes were prepared on one-yard samples of worsted cloth in laboratory kettles: Alizarine Blue SAP (CI 1054), Xylene Yellow G, Kiton Red BL. These were dyed with sodium sulfate and sulfuric acid. Then a compound shade of 2.8% Blue SAP, 12% Xylene Yellow G and 0.149% Kiton Red was dyed with 1) 5% anhydrous sodium sulfate, 4% sulfuric acid at pH 6.9 before acid, 2.5 after acid, 2.6 end; 2) 8.8% common salt, 4% sulfuric acid at pH 6.9 before acid, 2.5 after acid, 2.4 end; 3) 20% phosphoric acid, 26.4% disodium phosphate at pH 8.5 before acid, 5.8 after acid, 2.9 end; 4) 4% sulfuric acid, 5% disodium phosphate at pH 8.5 before acid, 2.8 after acid, 3.0 end; 5) 4% sulfuric acid at pH 7.3 before acid, 2.6 after acid, 2.7 end.

After examination of the above dyeings for shade, levelness and other distinguishing characteristics, a program was drawn up for laboratory dyeings to provide a "checkerboard" of information with respect to salts, acids and three dye formulas (chosen on the basis of level, unlevel and intermediate properties).

The following outline was carried out, with exhaust dyeings being made in all

cases.

Anhydrous sodium sulfate* was used in all laboratory and mill work to avoid possible confusion from water content. Purified low-calcium common salt (NaCl) was used to avoid variables and dulling.

Level Dyeing—No 1
- 0.5% Alizarine Blue WSA
- 0.5% Azo Phloxine GA Ex Conc
- 0.5% Fast Light Yellow 2G

Unlevel Dyeing—No 2
- 0.5% Alizarine Blue SKY
- 0.5% Alizarine Rubinol R
- 0.5% Sulfon Yellow RS

Intermediate—No 3
- 0.5% Alizarine Astrol B
- 0.5% Azo Rubine
- 0.5% Tartrazine X 100%

DYEING METHODS FOR ALL 3 FORMULAS, LIQUOR RATIO, 1:50

Acid	Sodium Sulfate (Anhydrous) %	Versus	Common Salt %
2% Sulfuric	none		none
	5		5
	10		10
	20		20
	none		40
4% Sulfuric	none		none
	5		5
	10		10
	20		20
	none		40
4% Formic 85%	none		none
	5		5
	10		10
	20		20
	none		40
5% Acetic 56%	none		none
	5		5
	10		10
	20		20
	none		40
10% Acetic 56%	none		none
	5		5
	10		10
	20		20
	none		40

A series of dyeings was made with 40% common salt and with 80% common salt, in the presence of acetic, formic and sulfuric acids.

In addition to the above outline, dyeings were also made with Formula No 2 (unlevel dyeing) with ammonium sulfate and with ammonium acetate in the presence of varying amounts of common salt and sodium sulfate.

Each dyeing and exhaust dyeing made in the above program was examined and evaluated by the committee in session. Each member was polled with respect to levelness of the comparable dyed samples, degree of exhaustion and any other characteristics noticeable.

CONCLUSIONS FROM LABORATORY WORK———On the basis of the information developed above, it was indicated that common salt might be used as a substitute for anhydrous sodium sulfate. It appeared that approximately four times as much common salt as anhydrous sodium sulfate would be necessary.

When the percentage of common salt approached three and four times the percentage of anhydrous sodium sulfate, it became increasingly evident that definite improvement in levelness and solidity was being obtained when compared to lower percentages of common salt.

MILL RUNS

ARLINGTON MILLS———Some mill runs were made at the Arlington Mills, Lawrence, Massachusetts, according to regular production routine. Purified low-calcium common salt was used in all runs.

The cloth used was a tropical-worsted gabardine. The shade was a medium blue, dyed with and without a chrome bottom.

Lot 1) Chrome bottom, dyed with 40% common salt.

Lot 2) No chrome, dyed with 40% common salt.

Lot 3) Chrome bottom, dyed with 9% sodium sulfate, anhydrous (standard mill formula).

Lots 1 and 2, dyed with common salt, were very satisfactory and equal to the results obtained with the regular formula containing sodium sulfate. Levelness and solidity were as good as had ever been obtained with sodium sulfate.

Dyes were chosen to represent fairly difficult formulations for obtaining level dyeing, especially without the aid of sodium sulfate or common salt.

DETAILED FORMULA AND PROCEDURE

LOT 1

Cloth: 74½ yards weighing 55 lb.

Chrome Bottom:

Liquor ratio, 1:20
1.25% chrome and
1.17% hydroxyacetic acid.
Brought to boil in 1 hr and boiled 1½ hr.

Dyeing:

Liquor ratio, 1:28
0.116% Alizarine Red S
0.038% Pontachrome Flavine A
0.736% Brilliant Alizarine Milling Blue BL
0.636% Alizarine Grey 2BLW 50%
40% common salt at start.
Brought to boil in 1½ hours, boiled 30 minutes. Cooled to 160°F.
1% ammonium sulfate added, bath brought to boil in 30 minutes, boiled 30 minutes, cooled to 160°F.
1% ammonium sulfate added again, bath again brought to boil in 30 minutes and boiled 30 minutes.

Additions:

First, 0.0078 lb Kiton Red BL
0.0200 lb Brill Aliz Milling Blue BL
Second, 0.0156 lb Kiton Red BL
0.0156 lb Brill Aliz Milling Blue BL
Bath cooled to 180°F for each addition, brought to boil in 20 minutes and boiled 20 minutes.

LOT 2

Cloth: 72½ yards weighing 55 lb.

Dyeing:

Liquor ratio, 1:28
0.23% Kiton Red 4BL
0.109% Xylene F Yellow 2GP
0.527% Brill Aliz Milling Blue BL
0.546% Aliz Grey 2BLW 50%
0.082% Aliz Light Brown BL
40% common salt at the start.
Brought to boil in 1½ hours and boiled 30 minutes.
1% ammonium sulfate added and bath allowed to cool to 160°F. Bath brought to boil in 30 minutes and boiled 30 minutes.

Additions:

First, 0.0312 lb Kiton Red BL
0.0937 lb Brill Aliz Milling Blue BL
Second, 0.0468 lb Kiton Red BL
0.0156 lb Brill Aliz Milling Blue BL
Third, 0.0312 lb Kiton Red BL
0.0312 lb Brill Aliz Milling Blue BL
0.0039 lb Xylene Fast Yellow 2GP
0.0039 lb Aliz Light Brown BL
Fourth, 0.0156 lb Brill Aliz Milling Blue BL
0.0039 lb Xylene Fast Yellow 2GP
0.0156 lb Aliz Grey 2BLW
Bath was cooled to 180°F for each addition, brought to a boil in 20 minutes and boiled 20 minutes.

LOT 3
STANDARD ROUTINE WITH SULFATE

Chrome Bottom:

Same as for Lot 1, but with addition of 0.50% tetrasodium pyrophosphate.

Dyeing:

0.11% Alizarine Red S
0.78% Neutral Fast Grey L
0.68% Brill Aliz Milling Blue BL
0.048% Pontachrome Flavine A
9% anhydrous sodium sulfate
1.5% tetrasodium pyrophosphate
1.5% acetic acid, 56%
3.0% ammonia water
0.5% acetic acid, 56%, for exhaustion.
Brought to boil in 1½ hours and boiled 30 minutes.
Bath cooled to 180°F and 0.5% acetic

NOTE: In comparing the formula for Lot 1 containing common salt with that for Lot 3 containing sodium sulfate, it must be noted that the slight variation in dye composition does not vitiate the general conclusions about levelness.

The formula for Lot 2 with common salt equalled the mill runs for the same formula but with sodium sulfate. Any other minor differences in procedure also do not alter the general conclusions.

acid, 56%, was added.
Bath was again brought to boil in 20 minutes, boiled 20 minutes, and cooled once more to 180°F.
Dyestuff for shading was added and bath was brought to a boil and boiled again for 20 minutes.
Cooling, feeding of shading dyestuff and boiling repeated as before.
Total boiling time, hour and 50 minutes.

The value of either common salt or sodium sulfate lies largely in overcoming skittery or mottled effects rather than cloudy, shady or ended conditions. Whereas 10% of anhydrous sodium sulfate has been accepted as generally satisfactory for this need, 40% of common salt has been found equally beneficial.

Many sets were dyed in production kettles with common salt without trouble or signs of corrosion, and there appeared to be no reason for not switching to common salt if availability or price advantage become factors.

Satisfactory speck-dyeing runs were also made in which common salt replaced anhydrous sodium sulfate on a pound for pound basis.

MERRIMACK WOOLEN MILLS——— On the basis of the good results obtained at the Arlington Mills, further development of information was carried out at the Merrimack Woolen Mills in Dracut, Massachusetts*. Four runs were made with level-dyeing colors in an acetic-acid dyebath. Two runs were made with neutral-dyeing colors in a dyebath buffered with ammonium acetate. All dyeings were made in stainless-steel kettles heated by passing live steam into the bath. Purified low-calcium common salt was used in all mill runs.

Regular mill runs were made on ladies' wear suede fabric with anhydrous sodium sulfate in comparison with common salt for a level-dyeing dye combination. The cloth had been cleaned in a trichloroethylene range, carbonized, neutralized and run direct to the kettle.

RUNS WITH LEVEL-DYEING DYES

RUN 1 WITH 10% SULFATE

Cloth: three pieces of 195 yards weighing 180 lb.
Dyeing:
Acid Blue ARB.....2.91 oz
Fast Light Yellow 2G.....0.9 oz
Acid Fuchsine 6B Conc.....260 grains
Azo Phloxine GA Ex Conc... 65 grains
sodium sulfate anhydrous (10% owf) .....18 lbs
acetic acid, 56% (10% owf).....18 lbs

The goods were run in water, the sodium sulfate was added, then the dye, and finally the acid. The bath was heated to the boil in one hour.

RUN 2 WITH 40% COMMON SALT

Cloth: same as in Run 1.
Dyeing: same as in Run 1 except
common salt (40% owf).....72 lb
acetic acid, 56% (10% owf).....18 lb

RUN 3 WITH 10% COMMON SALT

Cloth: same as in Run 1.
Dyeing: same as in Run 1 except
common salt (10% owf).....18 lb
acetic acid, 56% (10% owf).....18 lb

RUN 4 WITH NO SALT

Cloth: same as in Run 1.
Dyeing: same as in Run 1 except
no salt of any kind
acetic acid, 56% (10% owf).....18 lb

Results of the above four runs: Run 1 with sodium sulfate and Runs 2 and 3 with common salt were equally good. No unlevel dyeing or streaks were observed. The pieces passed regular inspection as very satisfactory.

Samples of the dye liquor were taken at 10 minute intervals and examined for color and pH (Beckman glass-electrode pH meter). The common salt held off from the cloth slightly more red than did sodium sulfate. At the end of the dyeing period the common salt bath still had as much color left as the sodium sulfate bath. The pH of the dyebaths was 3.0 at the start and 4.5 at the end of the dyeing.

The set run without salt of any kind was rejected by the inspectors as not passable because of decided unlevelness and very obvious, wide, red streaks. This bath without salt exhausted in less than one-half hour as against more than one hour in the case of 10% common salt.

RUNS WITH UNLEVEL-DYEING DYES

A formula consisting of dyes known to have unlevel dyeing characteristics was drawn up and applied to mill runs on covert cloth to compare sodium sulfate with common salt. The cloth was prepared as for the series with level-dyeing dyestuffs, that is, the goods were dry-cleaned on the trichloroethylene range, carbonized, neutralized, etc.

RUN 5 WITH 10% SULFATE

Cloth: one piece of 65 yards weighing 65 lb
Dyeing:
Liquor ratio, 1:40
Alizarine Rubinol R.....1.7 oz
Sulfone Yellow R.....1.35 oz
Alizarine Blue Sky.....1.04 oz
sodium sulfate, anhydrous (10% owf) .....6.5 lb
acetic acid, 56% (6.1% owf)
ammonia water, 26% (4.3% owf)
acetic acid, 56% (2.1% more owf)

After the goods were wet out, the sulfate was added to the bath, then the dye, acid and ammonia. The bath was heated to the boil and boiled ½ hour.

RUN 6 WITH 40% COMMON SALT

Cloth: same as in Run 5.
Dyeing: same as in Run 5 except
common salt (40% owf).....25 lb
was used (low-calcium grade) in place of sodium sulfate.

Results of the above two runs: The piece dyed with sulfate was very unlevel. Streaks and center-to-side variations were evident. The piece was rejected as not passable by the inspectors. The common salt piece was much better with only slight unlevelness. After ½-hour boil in 40% common-salt solution, the piece was passable.

PRODUCTION———On the basis of the above mill experiments, seven thousand pieces were processed with common salt in the dyebath. The entire production of the Merrimack Woolen Mill was put on common salt for three months, with results equally satisfactory with those obtained with sodium sulfate.

Practically all of the production was accomplished with 40% common salt on the weight of the goods. One especially difficult formula, which frequently showed unlevel results, gave no trouble when common salt was used. Most of the cloth was 12- to 18-oz material, and acid dyes were employed.

The conclusion reached concerning the Merrimack Mills project was that approximately 40% common salt satisfactorily replaces 10% sodium sulfate anhydrous.

No corrosion was noticed after weeks of running common salt in stainless-steel dye kettles.

GENERAL CONCLUSIONS

The results of this applied project indicates the satisfactory interchangeability of sodium sulfate (Glauber's salt) and common salt in the acid dyeing of wool. The amount of common salt required will vary with the nature of specific dye formulas and fabric used, but in general 40% common salt provides a usable starting point for comparison and development of common-salt usage to replace 10 to 20% sodium sulfate, anhydrous.

* See page P674 of this issue of *Am Dyestuff Reptr*, in which J D Justice reports data obtained in the observations of the first six runs at the Merrimack Mills.

COST———Price ratios and availability of the two salts are of course economic and market factors governing choice under existing conditions.

EQUIVALENCE———Both the theoretical and applied projects independently reached the same conclusions concerning the interchangeability of the two salts. The applied full-scale mill and laboratory work established the approximate ratio of 4 to 1 for the equivalence of common salt to sodium sulfate, anhydrous.

CORROSION ——— No evidence of corrosion of stainless-steel equipment was observed. According to information from the International Salt Company and stainless-steel manufacturers, no corrosion difficulties were anticipated.

LEVELNESS ——— Common salt and sodium sulfate produced equal levelness of dyed goods in mill runs as well as in laboratory experiments.

—♦ ♦—

Pacific Northwest Section Outing

ON A PERFECT summer day the third annual outing of the Pacific Northwest Section was held at Mount Hood Country Club, Welches, Oregon on August 9th, featuring a golf tournament and horseshoe pitching contest.

Golf winners were: *low gross,* R C Pickens, Portland Woolen Mills; *high gross,* C B Fieldhouse, Ciba Co, Inc; *long drive,* Don Adams, Portland Woolen Mills; *closest to pin,* Joe Vermeire, Portland Woolen Mills; *putting,* Ed Lindquist, Geigy Co, Inc; *best three holes,* H W Beck, National Aniline Division. In the horseshoe pitching contest J K White, Washougal Woolen Mills, was first and Dick Meiling, Van Waters & Rogers, was second. Dick Meiling, Van Waters & Rogers; Dale Kimsey, Geigy Co, Inc; Baxter Pearson, Monsanto Chemical Co; Ed Lindquist, Geigy Co, Inc, received door prizes.

The members of the Outing Committee were: Dick Meiling, Van Waters & Rogers Inc, Herbert W Beck, National Aniline Division; Ed Lindquist, Geigy Co, Inc, John Ayres, Du Pont, and R B Mulcrone, Washougal Woolen Mills.

Dinner was served at the club house following the golf tournament.

Respectfully submitted,

R M TRUE, *Secretary*

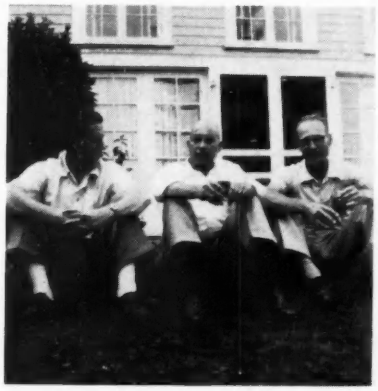
PNW SECTION OUTING PHOTOS

PACIFIC NORTHWEST SECTION OUTING COMMITTEE

Left to right: Dick Meiling, Van Waters & Rogers; H W Beck, National Aniline; Ed Lindquist, Geigy Co, Inc; John Ayres, Du Pont; Bob Mulcrone, Washougal Woolen Mills.

"Quartet"

Left to right: H A Des Marais, Pennsylvania Salt Co; Dick Meiling, Van Waters & Rogers; Richard Beaudoin, Washougal Woolen Mills; Don Adams, Portland Woolen Mills.



Left to right: Keith White, Portland Woolen Mills; J C Atchison, Washougal Woolen Mills; Herb Beck, National Aniline.

Summer Outing, South Central Section

ONE HUNDRED AND EIGHTY members and guests turned out for the annual summer outing of the South Central Section on August 22 and 23 at the Chattanooga Golf and Country Club, Chattanooga, Tennessee.

Golf, horseshoe pitching and fly casting were enjoyed by the men, and bridge and canasta by the ladies.

Winners of prizes in golf tournaments were as follows: *Low Gross for tournament and salesmen:* Dan Rion, Nopco Chemical Company, Athens, Georgia. *Low Gross for millmen:* R P Hardeman, Riegel Textile Corporation, Trion, Georgia. *Low Net:* Howard McCamy, Pepperell Manufacturing Company, Lindale, Georgia.

Runner-up salesman: Jack Boykin, National Aniline Division, Atlanta, Georgia. *Runner-up for millmen:* Tie between Max Ferguson, Riegel Textile Corporation, Trion, Georgia, and Val Van Winkleman, Riegel Textile Corporation, Trion, Georgia. *Runner-up Low Net:* Henry Gaede, Laurel Soap Corporation, Charlotte, North Carolina. *Longest Drive Contest:* Jack Anderson, Peerless Textiles, Inc, Cleveland, Tennessee. *Hole-in-one contest:* Cliff Smith, Onyx Chemical Company, Atlanta, Georgia. *Putting Contest:* Charles Spratt, National Aniline Division, Chattanooga, Tennessee. *High score prize:* Dr W F Luther, Dixie Mercerizing Company, Chattanooga, Tennessee.

Winners in other men's sports were as follows: *Fly casting:* Frank Cater, Ray-Ser Dyeing Company, Chattanooga, Tennessee; *Skeet shooting:* Philip Stevenson, Belcraft Chenille Corporation, Dalton, Georgia; *Horseshoe pitching: Singles:* Bill Kennedy, Arnold Hoffman Company, Atlanta, Georgia, *Doubles:* Norman Price, Rockwood Mills, Rockwood, Tennessee and Ed Jurczak, Burkart-Schier Chemical Company, Chattanooga, Tennessee.

The committee for the outing consisted of Joe T Bohannon, Jr, American Aniline Products, Inc, Chattanooga, Tennessee, *Chairman;* W K Newman, Peerless Woolen Mills, Rossville, Georgia, *Finance;* Mrs John O Sweitzer, Chattanooga, Tennessee, *Ladies Activities;* S C Hennessee, Dixie Mercerizing Company, Chattanooga, Tennessee, *Golf;* R W Freeze, American Aniline Products, Inc, Chattanooga, Tennessee, *Entertainment;* Ed Jurczak, Burkart-Schier Chemical Company, Chattanooga, Tennessee, *Men's Sports;* Glenn R Bellamy, Ciba Company, Inc, Chattanooga, Tennessee, *Prizes;* William G Agnew, Dixie Mercerizing Company, Chattanooga, Tennessee, *Registration.*

Respectfully submitted,

R W FREEZE, *Secretary*

CALENDAR

COUNCIL

November 6 (Boston), Jan 16, 1953; April 17, 1953; June 5, 1953.

GENERAL RESEARCH COMMITTEE

(See Council dates)

NATIONAL CONVENTIONS

November 6-8, 1952 (Hotel Statler, Boston); September 17-19, 1953 (Hotel Conrad Hilton, Chicago); 1954 (Atlanta, Ga.); Sept 21-25, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J).

HUDSON-MOHAWK SECTION

October 3 (Albany); October 24 (Utica); December 5, February 6, March 20, May 8 (Albany); June 19 (Outing).

MID-WEST SECTION

February 14 (Hotel Bismarck, Chicago, Ill); April 18 (Netherland Plaza, Cincinnati, O); June 20 (Outing, Lake Delavan, Wis); November 7, 1953 (Hotel Bismarck).

NEW YORK SECTION

October 24, November 21 (Kohler's Swiss Chalet, Rochelle Park, N J); January 30, February 27 (Hotel Statler, New York, N Y); April 17, May 22 (Swiss Chalet).

NORTHERN NEW ENGLAND SECTION

December 6 (Annual Meeting, Lowell Textile Institute).

PHILADELPHIA SECTION

Oct 24 (Penn Sheraton Hotel); Dec 5, Jan 16 (Kugler's Restaurant).

RHODE ISLAND SECTION

Oct 24 (Providence Engineering Society); December 5 (Annual Meeting, Sheraton-Biltmore, Providence, R I).

SOUTH CENTRAL SECTION

December 6 (Patten Hotel).

WESTERN NEW ENGLAND SECTION

Nov 14 and Dec 12 (Rapp's Restaurant, Shelton, Conn).

OTHER EVENTS

AMERICAN SOCIETY FOR TESTING MATERIALS

1953 Annual Meeting, June 29-July 3, Chalfonte-Haddon Hall, Atlantic City, N J.

AMERICAN STANDARDS ASSOCIATION

34th Annual Meeting, November 25, Waldorf-Astoria, New York, N Y.

ISO—TC 38 (Textiles)—SC-1 (Color Fastness), Nov 10-11 (ASA Headquarters, New York, N Y).

AMERICAN TEXTILE MACHINERY ASSOCIATION

Exhibit of American Textile Machinery, April 26-May 1, 1954, Atlantic City Exhibition Hall, Atlantic City, N J.

INTERNATIONAL COTTON AND RAYON EXHIBITION

Sept 27-Oct 12, Busto Arsizio, Italy.

INTER-SOCIETY COLOR COUNCIL

Nov 5 (Pepco Auditorium, Washington, D C).

NATIONAL ASSOCIATION OF HOSIERY MANUFACTURERS

41st Knitting Arts Exhibition, April 27-May 1, 1953, Atlantic City Auditorium, Atlantic City, N J.

NEW YORK BOARD OF TRADE (DCAT)

27th Annual Drug, Chemical and Allied Trades Dinner, March 5 (1953), Waldorf-Astoria, New York, N Y.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES

Nov 12, Dec 3 (Annual Meeting), Jan 14, Feb 11, March 11——all at the Hotel Commodore, New York; June 11-13 (Joint Outing with Manufacturing Chemists' Association at The Greenbrier, White Sulfur Springs, W Va.

TEXTILE RESEARCH INSTITUTE

23rd Annual Meeting, Nov. 17-18, Hotel Commodore, New York, N Y.

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

52-20

Education: Lowell Textile Institute, BTC.

Experience: Textile chemist and colorist, wool, nylon and wool blends.

Age: 38; married; references.

9-29, 10-13

NOTICE TO SECRETARIES AND PUBLICITY CHAIRMEN OF LOCAL SECTIONS

Papers presented before local sections should be sent to Dr Carl Z Draves, Editor of the *Proceedings*, 30 Lahey Street, New Hyde Park, New York. Authors should provide two copies for this purpose.

Reports of local section meetings should be sent to the American Dyestuff Reporter with copies going to Dr H C Chapin, National Secretary.

Dates of meetings and advance notices of meetings should be sent to the American Dyestuff Reporter with copies also going to Dr Chapin. For publication in any particular issue, information should be in the office of the Reporter 17 days before the issuance date.

Southeastern Section Meeting Report

September 13, 1952
Biltmore Hotel, Atlanta, Ga

THE Southeastern Section began their 1952-53 season with a most successful meeting on September 13th at the Biltmore Hotel, Atlanta, Ga.

The technical session began at 3 pm, and was featured by outstanding talks by J H Stradley of E I du Pont de Nemours & Co, Inc, on "Recent Developments in Beam Dyeing Techniques" and Dr A K Saville of du Pont's Technical Laboratory on "New Printing Techniques". In his talk, Dr Saville stressed the success of the use of a steamer in vat dye printing.

An hour of good fellowship followed the afternoon session.

Following dinner in the main ballroom, R K Mason, in charge of construction at the Savannah River plant, discussed the many unusual aspects of the project.

A short business session closed the meeting.

Respectfully submitted,
J W SWINEY, *Secretary*

LAPEL BUTTONS

for

AATCC MEMBERS

These buttons bear the Seal of the Association and may be purchased by members in good standing from the National Secretary at $2.00 each.

DR H C CHAPIN
Lowell Textile Institute
Lowell, Massachusetts

REPORTER REACHES THIRTY-FIFTH BIRTHDAY

THE AMERICAN DYESTUFF REPORTER became thirty-five years old this past October 8th, the first issue having appeared on October 8, 1917. Coincidentally, as the REPORTER was started to foster the infant American dyestuff industry, that industry is also thirty-five years old.

The REPORTER was the outgrowth of a department in *Dry Goods Guide* which was started in 1916 as part of an educational campaign directed to retailers to explain to them the dyestuff situation as it then existed in this country. At that time A P Howes was editorial director and advertising manager of *Dry Goods Guide* and Myron D Reeser was advertising representative.

The first apearance of a dyestuff advertisement in the *Guide* was in July, 1916 and the advertiser was Marden, Orth & Hastings Co, a large general jobbing house which handled dyestuffs along with other merchandise. In August the dyestuff department first apeared and the initial article was entitled "The Dye Situation" and was prepared by H Gardner McKerrow, then employed by Marden and later advertising manager of National Aniline & Chemical Co. This article was the first appeal for tariff protection to appear. In this issue were advertisements from A Klipstein & Company and Logwood Products Corporation. Other early advertisers in the department were Ernest Zobel Company, John Campbell & Co, Williamsburg Chemical Company, National Aniline & Chemical Co, Dicks, David & Broadfoot and New York Color & Chemical Company.

Interest continued and grew in the dyestuff department and it was decided that the infant dyestuff industry could be better served by a separate publication circulated throughout the entire textile field at frequent intervals. Accordingly the first issue, published by the Hewitt Publishing Corporation, publishers of the *Guide*, appeared on Monday, October 8, 1917. It was a 16 page newspaper, 6 x 9 inches in size, to be published weekly. The leading article indicated clearly the purpose of the new publication as evidenced by the following quotation:

"This is the initial number of the AMERICAN DYESTUFF REPORTER. Hereafter it will come weekly to your desk. It is published in the interests of consumers of dyestuffs, colors and allied chemicals. It aims to establish a closer association—a better understanding—among all elements in this newest of American industries. Its mission is worthy—with your help it can succeed.

"To accomplish this end we have set, for the AMERICAN DYESTUFF REPORTER, the following rules of conduct:

"1. To print only information which is in every respect reliable.

"2. To avoid misrepresentation and exaggeration in every form.

"3. To avoid recommending or endorsing in our editorial columns the goods of any particular manufacturer.

"4. To avoid advertising individuals or firms under the guise of special articles.

"5. To expose and combat all questionable practices in the trade and those who practice them.

"To those consumers who read this first issue of the REPORTER let us say that it is in the strictest sense your magazine. It is published for the consumer and, in so far as we can make it so, shall be directed by the consumer. Let us know what you need in a trade paper and we will endeavor to fill your wants."

Shown on the masthead of this issue were: Dexter W Hewitt, President; A P Howes, Vice President; Elisha Hewitt, Secretary and Treasurer; and Myron Drew Reeser, Managing Editor. Both of the Hewitts and Mr Howes have since passed away. Mr Reeser is now Business Manager of the publication and Vice President of the Howes Publishing Company.

The REPORTER devoted itself to development of sentiment among dyestuff consumers favorable to government protection either by tariff legislation or definite em-

AMERICAN
DYESTUFF REPORTER

A Weekly Publication devoted to

DYESTUFFS, COLORS and ALLIED CHEMICALS

Circulating Wherever Dyestuffs are Used

Vol. I | New York, October 8th, 1917 | No. 1

THIS is the initial number of the AMERICAN DYESTUFF REPORTER. Hereafter it will come weekly to your desk. It is published in the interests of consumers and manufacturers of dyestuffs, colors and allied chemicals. It aims to establish a closer association—a better understanding—among all elements in this newest of American industries. Its mission is worthy—with your help it can succeed.

When the resources of any industry are taxed as were those of American chemical manufacturers upon the suspension of German importations, when a sudden demand arises for products never before produced in this country, when all the essentials of manufacture—although present—are entirely undeveloped, when there is no precedent to follow and all progress must be achieved through painstaking and expensive experiment—when conditions of this sort exist, it is inevitable that tremendous confusion should result. And this confusion invariably affords opportunity for irresponsible and unprincipled operators to enrich themselves at the expense of the consumers, who, finding regular channels of supply closed to them, will, in desperation, "take a chance" on anything which promises even partial relief from their embarrassment.

This is exactly what happened in the dyestuff market three years ago. The exorbitant prices which were obtained for the relatively small stocks of German colors held in this country, the adulteration which was practised, the unscrupulous and oftentimes downright dishonest methods employed by a host of "war brokers," are matters of common experience. Little by little, however, this condition has righted itself. Consumers have learned to discriminate between these dealers who are trustworthy and those who are not; strongly financed concerns of serious purpose have gone systematically about the business of producing satisfactory colors in this country; a great deal of the "mystery" about dyestuffs has been eliminated and the industry is in a fair way to establish itself upon a sound and reputable basis.

There remains, however, a great deal to be accomplished before the American Dyestuff Industry can be said to have achieved a degree of perfection comparable to that enjoyed by the German industry in this country before the war American capital and American brains are constantly at work in an effort to accomplish this end but it is not to be expected that an industrial revolution can be consummated over night. In the meantime, the best interests of both consumers and manufacturers can be served if a spirit of trust, confidence and mutual helpfulness can be established between all parties at interest.

To foster such a spirit is the foremost aim of the AMERICAN DYESTUFF REPORTER. We believe that a magazine which will represent only the best elements in the field of dyestuffs, colors and allied chemicals, and which will circulate wherever these products are consumed (including the textile, paper, leather, paint trades, etc.) can, if edited efficiently, cleanly and fearlessly, do a great deal toward promoting a closer friendship between consumer and manufacturer to the end that all elements of the trade shall be benefited thereby.

Front page of the first issue of the REPORTER, a sixteen page 6" x 9" newspaper with self cover.

Standard Dye Tests and Standard Records—A Plea

By LOUIS A. OLNEY
Professor of Chemistry and Dyeing, Lowell Textile School
President, Stirling Mills, Lowell, Mass

IN a statement so condensed that even the busy man can and will take time to read it, I wish to make a plea for greater efforts toward the standardization of methods of dye testing and uniform methods for recording such tests.

Every user of dyes is interested in the fastness of his colors toward one or more of the following color destroying agencies: Light, washing, scouring, bleaching, acids, alkalies, fulling, carbonization, perspiration, etc.

As yet no official methods of making or recording such tests have been accepted by any duly authorized body, and much confusion and no little misunderstanding is constantly arising between various interests particularly the textile manufacturer and the dyestuff maker and dealer.

In many instances the large textile manufacturing interests have worked out rather elaborate systems for their individual requirements. Some of the foreign dyestuff concerns have also done more or less along this line, but their work has always been from the point of view of the dyestuff manufacturer or dealer and not particularly in the interests of the consumer. No organized effort has thus far been made with the object of adopting a standard working agreement or system, mutually acceptable to the various interests.

As a result, one textile manufacturer attempting to communicate with another or with a dyestuff dealer in regard to the fastness of a certain dye is often at a loss to know by the statements made just what degree of fastness the other intends to convey and whether they are all in agreement with each other. The economic losses arising through such misunderstandings and which might be eliminated, partly at least, through official standards cannot of course be measured, but must run into very many thousands of dollars each year.

The difficulties and the expense which would be encountered in the perfection of such standard methods have in a way delayed their introduction, but the chief cause of postponement has been the lack of realization that such a series of tests could be devised and adopted.

In the writer's opinion the establishment of such a set of officially recognized standard methods of dye testing is possible, but before any headway can be made toward this end three essential requirements are absolutely necessary.

1. Development of sufficient interest on the part of both manufacturers and consumers of dyes, but particularly the latter

2. Accurate research and experimental work extending over a considerable period of time.

3. Sufficient funds to carry on such work.

Sufficient interest will develop as soon as the extensive users of dyes throughout the country realize the value of such a series of officially recognized tests. As soon as such an interest develops the funds will be forthcoming, as has been the case with co-operative movements on the part of other industries. As soon as the funds are forthcoming the proper workers may be secured and the work pushed along to a successful termination.

Development of sufficient interest is therefore fundamental and the main object of this appeal is to develop such an interest. It is hoped that at an early date expressions of opinion from some of the leading textile manufacturing and dyestuff associations may be published.

It is recognized, of course, that some dyestuff dealers and manufacturers who sell practically the same articles in competition with each other under different names and in varying strengths might object to standard tests which would at once classify their products, but the good of the majority ought to prevail.

Expressions of opinion from representatives of textile manufacturing concerns and various color interests will be welcomed by the editors of the AMERICAN DYESTUFF REPORTER.

HERE is a suggestion to dyestuff consuming and manufacturing interests which is well worth careful consideration. The importance of the general subject of standard tests for fastness has long been recognized, but for one reason or another no concerted movement in this direction has been inaugurated. Publicity and a general discussion of the subject are prerequisites to any constructive action and, as Professor Olney suggests, The Reporter will be glad to co-operate in any such movement to the extent of its ability.

Reproduction of page in Monthly Technical Supplement of American Dyestuff Reporter for September, 1920. This is perhaps the first editorial appeal for the promotion of an association such as the AATCC.

bargo against foreign competition to enable the domestic dyestuff industry to survive. This campaign continued until Congress acted favorably.

The acquisition of the REPORTER by the Howes Publishing Company is best told in Mr Howes' words, as published in our December 2, 1946 issue:

"By late spring of 1918 it had become apparent that the AMERICAN DYESTUFF REPORTER was steadily gaining in consumer interest and advertising support and it seemed probable that the magazine would become profitable from a publication standpoint in the not distant future. Coincidentally, the affairs of Hewitt Publishing Corporation, because of the unfortunate purchase of an additional property on the basis of serial notes to be met in the future, were in a pretty bad way, leading me to believe that the corporation was headed for bankruptcy—a condition which subsequently ensued.

"Accordingly, I approached the Hewitts with a suggestion that they should give me a bill of sale of AMERICAN DYESTUFF REPORTER in return for the surrender to them of stock and notes of the Hewitt Publishing Corporation which I held. After some protest on their part, this arrangement was consummated and on July 1, 1918, the Howes Publishing Company, newly formed, took over ownership and direction of the REPORTER.

"By some coincidence, the first issue produced under the new management, that of July 1, 1918, also marked the first appearance of the DuPont Company as a regular advertiser. The page appearing therein bears the familiar DuPont oval and the first announcement of the production of synthetic indigo."

Other advertisers who soon began to use space included the Newport Chemical Works, Dunker & Perkins Co, Jennings & Co, S R David & Co, F E Atteaux & Co and United States Color & Chemical, all of these in New England with the exception of Newport.

By 1920 it became apparent that the original purpose of the REPORTER, to function as a propaganda sheet for the dyestuff industry, was no longer valid—what was now needed was technical information having to do with the application of colors and allied chemical problems. Accordingly, it was decided to publish monthly technical supplements to the weekly news edition. The first issue appeared on August, 1920, with Dr Louis A Olney as Advisory Editor. Dr Olney continued as Directing Editor in later years until his death in 1949.

The Technical Supplement was published as a 9 x 12 magazine, with coated stock, suitable for halftones.

In the September, 1920, issue there appeared an article by Dr Olney entitled "Standard Dye Tests and Standard Records —A Plea" which pointed out the necessity for such. Although it did not call for the formation of an Association to carry out the plan, it was the forerunner of other articles which eventually led to the organization of the AATCC. The first direct appeal appeared in the June, 1921 issue of the Technical Supplement in an editorial by A P Howes entitled "Wanted: A Technical Association of the American Textile Industry". Portions of this read as follows:

"The benefits to be derived from a technical association of the textile industry are obvious. It would make possible the freer exchange of ideas and could provide for the dissemination of knowledge useful to all. It might reasonably be expected to develop better acquaintanceship and morale among technical men, to stimulate the spirit of research, and to emphasize right educational methods in the industry—all of which are results worth going after.

* * *

"Very important, likewise, it would greatly facilitate the establishment of standards, particularly standard methods of dye testing. The need for the latter has been repeatedly emphasized by the REPORTER and our remarks on this subject have received endorsement from many leaders in dyestuff and textile circles. It is a need universally recognized throughout the industry, and the sole reason why it remains unfilled today is because of the lack of machinery for concerted action. Standard

methods for textile testing and analysis should also be legitimate fields of endeavor for such an organization.

"The REPORTER believes that the time is ripe for the organization of a technical association of the textile industry, and that the industry would gain immeasurably by the presence of such a body within its ranks. We shall be glad to learn the views of readers on this important subject, to give publicity to any suggestions which would be of interest along this line, and shall account it an honor if we can be of service in aiding those desirous of bringing about the creation of such a body."

Marked copies of this issue of the REPORTER were mailed to various individuals in the field and comments were requested. The response was unanimously enthusiastic in favor of the plan. The editorial campaign continued in the following year and culminated with the publication in September, 1921, of a leading article entitled: "Standard Methods of Dye Testing and an American Association of Textile and Color Chemists" which was further amplified by a subheading "How the Former May Be Obtained Through the Latter —Why an American Association is the Logical Body for the Determination of Standards — Objects and Membership — Hampering Traditions on the Wane". The result is the AATCC—now 31 years old and holding its Convention in the city of its inaugural meeting.

The cooperation between the AATCC and the REPORTER started as soon as the Association was formed. Following is the letter from Mr Howes to Dr E H Killheffer proposing the arrangement still existing:

* * *

September 27, 1921

Dr E H Killheffer, Chairman
Committee on Publicity and Publications,
American Association of Textile Chemists and Colorists,
Passaic, N J

Dear Dr Killheffer:

As you possibly know, the AMERICAN DYESTUFF REPORTER has taken a very active interest in the formation of the proposed Association of Textile Chemists and Colorists. Now that this Association is about to become a reality, the writer is anxious that the REPORTER should continue to cooperate in every way possible toward making the Association a complete success.

In this connection it occurs to me that we might be of service to the Association, during its infancy at least, by offering a portion of our pages to the Association for the purpose of carrying to its members reports of its meetings, committees, technical papers and such other matters as would ordinarily be contained in the journal of such an organization. With this idea in mind, I beg to make to you, as Chairman of the Committee on Publicity and Publications, the following offer on behalf of the Howes Publishing Company, publishers of the AMERICAN DYESTUFF REPORTER:

For a period of six months from the formation of the proposed Association we will place at its disposal a sufficient number of pages in the technical issues of the AMERICAN DYESTUFF REPORTER to carry all the material which the Association deems it advisable to print and distribute to its members. The form of the type matter and general arrangement of these pages can be supervised and directed by anyone whom the Association may designate as editor, or, if the Association prefers, we shall be glad to assume such supervision under the general direction of the proper officers. These pages can be kept as a separate section, distinct from other text pages in the REPORTER. During this six months' period we will agree to carry the name of every member of the Association upon our mailing list. For this service we will make no charge whatever.

At the expiration of six months, if the Association is satisfied with this service and desires us to continue it, we shall be glad to do so on a basis which will provide that the Association reimburse us for the actual cost of printing and distributing the text matter involved.

This suggestion is, of course, merely in

AMERICAN
DYESTUFF REPORTER
In Two Sections—Section Two
Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.
LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Advisory Editor
LAURANCE T. CLARK
Managing Editor
Published by
HOWES PUBLISHING CO., INC.
4109 Woolworth Building, New York City
A. P. Howes, *President* E. C. Mayer, *Business Manager*
Subscription price $5.00 per year: Canadian $5.50; foreign $6.00.
Vol. VIII June 6, 1921 No. 23

WANTED: A TECHNICAL ASSOCIATION OF THE AMERICAN TEXTILE INDUSTRY

"HE travels fastest who travels alone" is not an adage enjoying good standing among those responsible for our modern industrial development. Today it has become the merest truism to say that in organization there is strength, efficiency, economy and increased production. Industrial co-operation is no longer merely an advantage; economic conditions have made it an actual necessity.

This need is one which has not been escaped by the textile industry of this country, and a survey of its various parts makes it fairly plain that the particular department through which such co-operation could enter and find application to the best advantage is by way of its technologists. Time was when empirical skill alone constituted the basis of achievement in the industry; now it has come about that mill owners the country over recognize the value of a technical textile education. The trained mill man is increasing in numbers and importance, and his work is so far becoming the moving force of the industry that the textile technologists of to-day are the executives of to-morrow. But the full possibilities of their usefulness have not yet been generally realized, in part, at least, because they have lacked an organization of their own which would enable them to co-operate in a really effective manner.

The benefits to be derived from a technical association of the textile industry are obvious. It would make possible the freer interchange of ideas and could provide for the dissemination of knowledge useful to all. It might reasonably be expected to develop better acquaintanceship and morale among technical men, to stimulate the spirit of research, and to emphasize right educational methods in the industry—all of which are results worth going after. By degrees it could accumulate and preserve, in the form of a library, a great mass of information much needed by textile men, and it could even assist in the preparation of a series of text-books of great worth. Very important, likewise, it could greatly facilitate the establishment of standards, particularly standard methods of dye testing. The need for the latter has been repeatedly emphasized by The REPORTER and our remarks on this subject have received endorsement from many leaders in dyestuff and textile circles. It is a need universally recognized throughout the industry, and the sole reason why it remains unfilled to-day is because of the lack of machinery for concerted action. Standard methods for textile testing and analysis should also be legitimate fields of endeavor for such an organization.

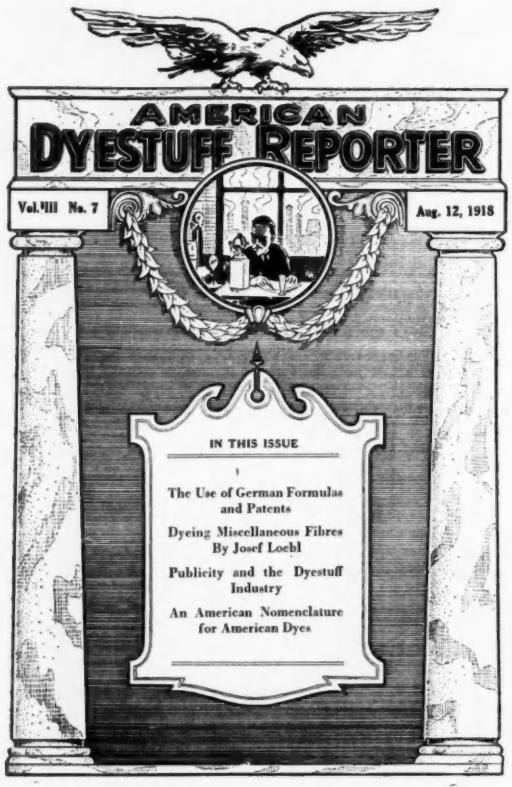
As to details, the suggestion is offered—and it is a suggestion only—that membership might well consist of active members, junior members and corporate members. The age requirement for active members might be placed at twenty-eight years or over. They should possess a technical education or its equivalent and should have been actively engaged in the manufacture of textiles or in industries or institutions related thereto for at least five years, and in responsible positions for at least three years. Fulfillment of the duties of a professor of applied science to the textile industry who is in charge of a department in a college or school of accepted standing, might be taken as the equivalent of an equal number of years of active practice. Junior members might be admitted at the age of twenty-one years or over, and should have had such training as would enable them to fill subordinate positions in the industry; or they should be graduates of technical schools of recognized standing.

Corporate members might consist of individuals, firms or corporations actively engaged in the manufacture of textiles, or in the manufacture or sale of chemicals or other materials used in the textile industry. Such a class of members would be desirable by reason of the fact that the nominal dues paid by active and junior members would scarcely avail to defray the cost of such research work as it would be to the best interests of all to have the association undertake. It has been demonstrated in other industries that the cost of research work of a really serious and ambitious character is surprisingly low to such corporate members. Each corporate member, of course, should name an individual to vote for it at meetings.

Meetings might be held two or three times a year, and during these meetings technical and engineering problems could be discussed. The organization could also accomplish much through the appointment of standing committees delegated to take specific problems under consideration.

For a concrete example of the efficacy of such an industrial body, one has only to turn to the Technical Association of the Pulp and Paper Industry, which is organized along lines very similar to those outlined above and which is unquestionably accomplishing a most important work in getting its members ready to become leaders in the paper industry of the future.

Reproduction of an editorial in the American Dyestuff Reporter for June 6, 1921, calling for the formation of a Technical Association.


AMERICAN
DYESTUFF REPORTER
Vol. VIII No. 7
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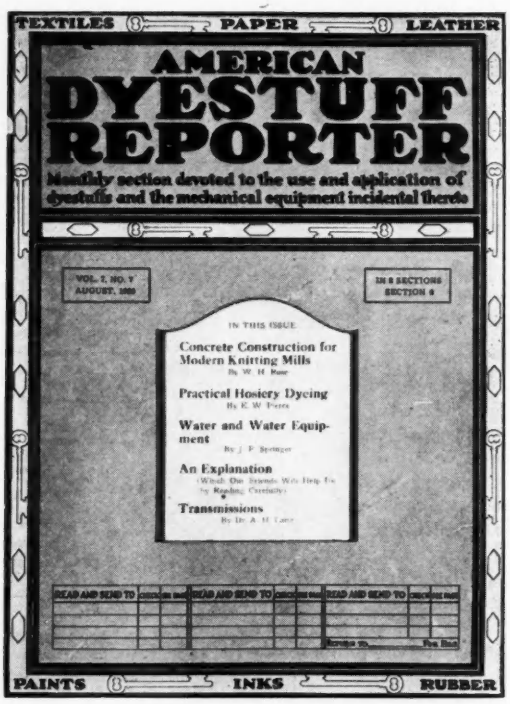
An American Nomenclature for American Dyes

First issue of the REPORTER to appear with a cover. Size: 6" x 9".



First issue of the Monthly Technical Section of the REPORTER in 9" x 12" size issued as a supplement to the small weekly newspaper.

skeleton form and is susceptible of modification or amplification, as the exigencies of the situation may dictate. The thought which I wish to convey is that we should be glad to relieve the Association of any expense incident to its publications for a period of six months and to continue the service thereafter at actual cost, if it is so desired.

The writer is prompted to make this offer because he presumes that the Association will wish to have some official means of keeping its members advised as to its proceedings but that financial limitations during its infancy will hardly warrant the expense incidental to the publication of its own journal.

Trusting that your Committee will give this offer consideration and advise me in due time of your decision in the matter, I am,

Faithfully yours,
A P HOWES
President, Howes Publishing Company

* * *

Dr Killheffer recommended at the Inaugural Meeting that this offer be accepted and it was unanimously adopted. Subsequently, when the Association became a corporate body a contract was signed providing for the continuation of this service for fifty years. The contract was revised in 1947 and extended for another fifty years.

In order to better serve the Association in the publication of its *Proceedings* the Monthly Technical Supplements and the weekly news edition were combined in January of 1922 and publication began on alternate Mondays with the *Proceedings* bound as the central portion of each issue. This arrangement continues in essentially the same form today.

Since the establishment of the Association the REPORTER'S growth has been coincident with that of the Association. In 1931, ten years after the birth of the Association, the circulation was in the neighborhood of 2,500. Today, about 9,500 copies of each issue are printed and the Association's membership is about 6,800; there is a foreign circulation of over 1,500.

An interesting opinion on the agreement existing between the REPORTER and the AATCC was expressed in 1933 by Gordon D Pratt addressing the National Convention of the AATCC in Chicago as an official representative of the British Society of Dyers and Colourists when he said:

"The objects and works of our Society are very similar to your own, namely, the advancement of textile and colorist technology in its very widest sense. Our monthly Journal is, I think, as highly regarded on this continent for the excellence of its technical publications as it is in Europe. Incidentally, I would mention that the Journal is a continual drain on the funds of the Society and I think you relieve yourselves of a tremendous responsibility and financial expenditure, when you join as you do in a regular trade publication rather than attempt to publish your own journal."

As the Association has grown so has its publications in the *Proceedings*. Currently there is little of interest to the Association which is not also of primary importance to the REPORTER. The best of technical information in this country consistently appears in its pages.

In addition to Mr Reeser, the staff of the REPORTER is now headed by Norman A Johnson, Editor; Herbert A Stauderman, Advertising Manager; and Charles A Whitehead, Managing Editor. Mr Johnson joined the Howes Publishing Company in 1931 and now also holds the positions of Vice President and Treasurer. Mr Stauderman came to the organization in 1945, following his discharge as a Captain in the army, as a sales representative and was made advertising manager in 1951. Mr Whitehead assumed editorial duties in 1949 following his graduation from Lowell Textile Institute and was appointed managing editor later that year.

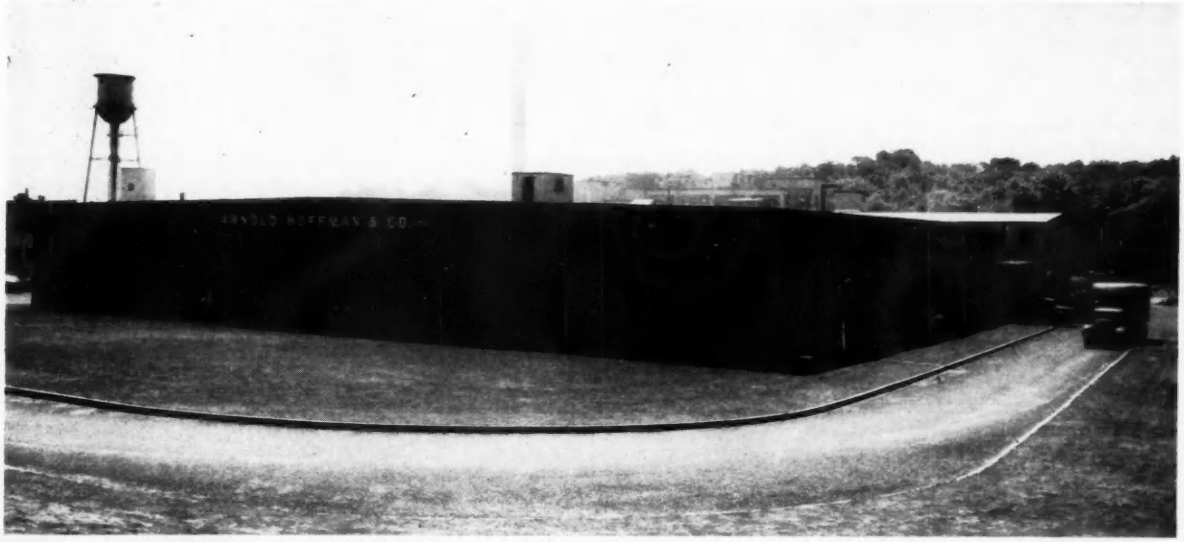
Mention must also be made of the invaluable contributions of Dr Carl Z Draves as Editor of the *Proceedings* and of our contributing editors: William H Cady, Abstracts; Dr Paul Wengraf, Patents; and Prof John H Skinkle, Book Reviews.

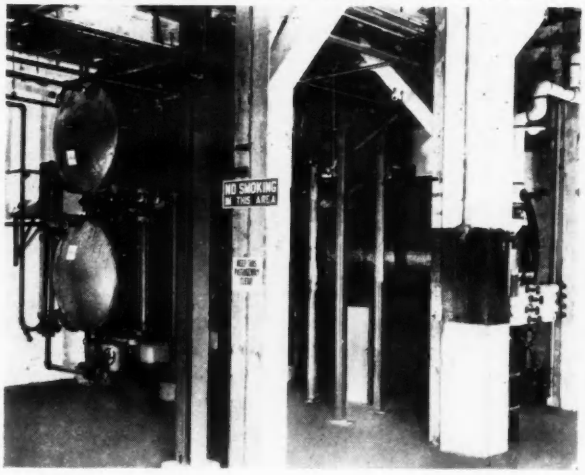
NEWS

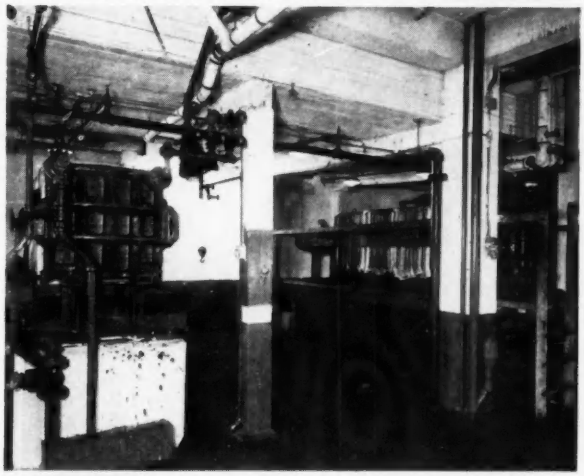
• Arnold, Hoffman Producing Soluble Vat Dyes

Shortly after its entrance into the vat dye manufacturing field with its line of Ahcovat colors, the Arnold, Hoffman & Co, Incorporated, Providence, Rhode Island, initiated plans for the production of soluble vat dyes at its plant at Dighton, Massachusetts. After becoming associated with Imperial Chemical Industries Limited of Great Britain in 1950, these plans were accelerated as a part of the expansion program which was one of the principal objects of this association.

A building formerly used for the production of dextrines and textile specialties, the manufacture of which had been







Views of the Arnold, Hoffman Plant at Dighton, Mass.

recently transferred elsewhere, was remodeled and enlarged to make a thoroughly modern unit for the manufacture of soluble vat dyes. As one of the pioneers in the research and development of this class of dyes, which is steadily growing in importance in the textile field, ICI has not only contributed experience and know-how to the solution of the difficult problems in the manufacture of this class of colors, but its vast research facilities have contributed new and improved methods of manufacture. As a result of new patented processes it is expected that the line of Ahcovat Soluble dyes will include in the near future a number of soluble vats which could not be produced by the older processes. These new dyes will constitute a very important addition to the range presently available.

The new plant is in charge of Charles Miller, who, after many years of experience in the Grangemouth Works of ICI in Scotland, has recently been appointed Works Manager of the Dighton Plant. One of his principal duties while at Grangemouth was the production of Soledons, under which name the soluble vat dye range of ICI is marketed.

In planning this new production unit, the Arnold, Hoffman & Co, Inc has visualized a steady and rapid increase in the consumption of the soluble vat dyes due to their versatility and wide range of application, which includes not only the cotton, rayon, and wool fibers, but many of the new synthetic fibers as well. The new plant will be an important contribution to this country's resources serving the textile industry.

The new range will be sold under the general name of "Ahcovat Soluble" dyes. Currently in production at the Dighton Plant are the following colors:

Ahcovat Soluble Green IB
Ahcovat Soluble Olive Green IBL
Ahcovat Soluble Pink IR
Ahcovat Soluble Brown IBR
Ahcovat Soluble Indigo O
Ahcovat Soluble Golden Yellow IGK
Ahcovat Soluble Golden Yellow IRK
Ahcovat Soluble Blue IBC

• Atlantic Moves to Increase Activities; Announces New Management Set-Up

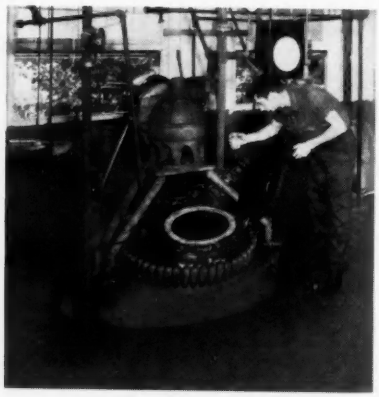
In a statement released by Hugh J Bonino and Joseph Buonanno, it is disclosed that Ernest Nathan and Henry Papini have joined with Mr Bonino and Mr Buonanno in the management and ownership of Atlantic Chemical Co, Inc, Centredale, R I. Both Mr Nathan and Mr Papini were former Warwick Chemical Company and Sun Chemical Corporation executives.

Ernest Nathan, founder of the Warwick Chemical Co in 1930 and most recently vice president and chairman of the chemicals group at Sun Chemical Corp, becomes Chairman of the Board of Atlantic Chemical Co, Inc. He resides at 15 Avon Road, Larchmont, New York.

Mr Papini's new office will be in Greenville, S C. With Warwick, he was sales manager in the Carolinas.

Under the new set-up, the officers of the Atlantic Chemical Co, Inc are as follows:

Chairman of the Board..Ernest Nathan
President.....Joseph E Buonanno
Vice President & Secretary.....Hugh J Bonino
Vice President.....Henry Papini
Treasurer.....Ernest Nathan
Vice President and General Manager.....Bernard Buonanno
Asst Vice President.....James C Shore
Directors.....Ernest Nathan, Joseph Buonanno, Hugh J Bonino and Henry Papini



New, glass-lined Pfaudler kettle in operation.

OFFICERS OF ATLANTIC CHEMICAL CO, INC

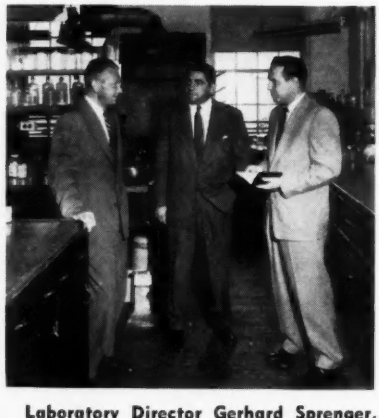
(L to r): B Buonanno, H Papini, E Nathan, H Bonino, J Buonanno, J C Shore.

The new alignment ties in with major expansion plans on the part of Atlantic, not only in sales services and the active expansion of plant and laboratory facilities in New England, but also in the South and in Canada.

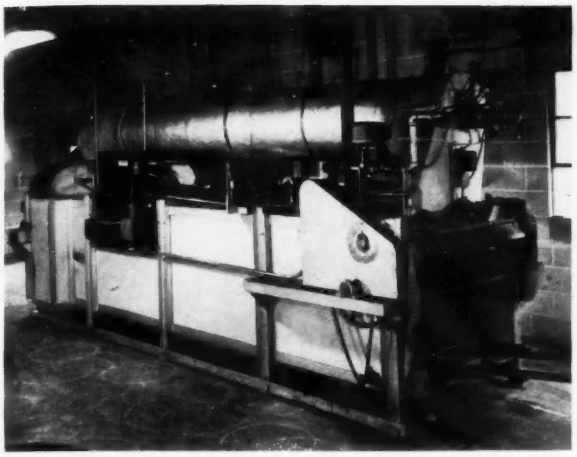
Plans have been drafted calling for establishment of a branch plant in South Carolina, the details of which are moving steadily ahead. In Canada, Atlantic has recently established Roxbury Chemical Company—Canada Ltd in Granby, Que, a fully-owned subsidiary. The establishment of a manufacturing plant in Canada is also planned.

In addition to their current lines of textile chemicals and resins, Atlantic is reportedly formulating plans to include pigment colors for printing and dyeing, to be known as Atcotones. (Atlantic is a co-owner of Metro Dyestuff Corporation, West Warwick, R I, manufacturers of dyestuffs, which will become a major factor in the new program).

The Company also reports progress in the fields of water repellents, surfactants and fatty acid amine condensation products. Facilities for the manufacture of



Laboratory Director Gerhard Sprenger, President Joseph Buonanno and Charles A Whitehead, Dyestuff Reporter, discuss research progress at Atlantic.



Modern drum and barrel baking oven used in the reconditioning of Atco containers.

Battery of storage tanks under construction outside Atco's main plant.

oleoylmethyltauride as well as other new resins and resin emulsions are set up and Atlantic officials also contemplate putting in high temperature condensation equipment, it is reported.

A tour through the Centredale plant, which currently occupies 80,000 square feet on a 14-acre site, impresses the observer as to its physical characteristics.

In addition to a complete library, the Company possesses fully equipped temperature control and general control laboratories in addition to general research laboratories under the direction of Dr Gerhard Sprenger.

Two new Pfaudler kettles, new batteries of detergent kettles, a battery of gum cookers, an acetylene oxidation unit, a battery of seven vats for sulfonated oils and fats, and a portable Morehouse drawing mill are only a few of the features which catch the eye of the "tourist" in the main section of the plant. Outside, the construction of a battery of huge storage tanks for formaldehydes, amines, fatty acids, etc, stands nearly completed. Plans for the installation of another boiler to meet expansion needs are also underway.

In another section of the plant is housed a complete drum and barrel reconditioning unit. Here the drums (or barrels) are washed, dried, sandblasted, sprayed with a heresite lining and finally baked in an oven at 450°F.

Standing ready to carry Atlantic's products to all points of New England, the Middle Atlantic States, the South and Canada are a fleet of diesel-powered trucks.

NAMES IN THE NEWS

J D Dean

JAMES D DEAN rounded out more than 37 years of textile research and development work when he retired recently from the Department of Agriculture's Southern Regional Research Laboratory in New Orleans. During most of the last decade of his career, he was head of the Southern Laboratory's Cotton Chemical Processing Division.

Since his appointment to the staff of the Southern Laboratory in 1942, Mr Dean has directed and participated in research programs of regional and national significance on the chemical processing of cotton. Under his direction this research has resulted in many scientific publications and patents involving the chemical processing of cotton, including the differential dye-test method for detecting immature and mature cotton fibers, a semi-elastic bandage, and partially acetylated cotton products.

Mr Dean took an active part in developing and standardizing some of the test methods for rot and weather resistance of textiles that appear in numerous Army and Federal specifications, and directed research on protective treatments for military fabrics for the Corps of Engineers and the Quartermaster Corps of the U S Army.

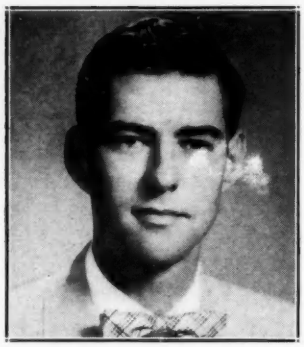
Prior to his employment at the Southern Regional Research Laboratory in 1942, Mr Dean had lengthy experience in textile research and development work with the Sylvania Industrial Corporation, the Celanese Corporation of America, Lyman Department of Pacific Mills, Robertson Bleachery and Dye Works, Inc, and the United States Finishing Co.

SINDAR CORPORATION has announced the appointment of LEONARD STOLLER as advertising manager.

ROBERT N PENNIE has been appointed research director of Amalgamated Chemical Corp, Philadelphia, succeeding HILLARY ROBINETTE, JR, who has resigned to establish a consulting business.

Mr Pennie joined the research staff at Amalgamated in 1950. He has recently done a great deal of work on a government research project on the preparation of flame-proofing compounds for textiles. In the new position, he will direct research and development on new chemicals for the textile, leather, and paper industries.

CHARLES R BRINKERHOFF, secretary of the Millmaster Chemical Corporation, New York, has been elected a director of the Berkeley Chemical Corporation, Berkeley Heights, New Jersey.



P E MacLean

PHILIP E MacLEAN, New England District Manager for the Onyx Oil & Chemical Company, Jersey City, N J, and recently-elected President of the Lowell Textile Institute Alumni Association, has pledged himself to continue the policies which have brought about the remarkable progress of the latter organization under the leadership of his predecessor, RALPH K HUBBARD.

Mr MacLean, one of the youngest men to hold the Presidency in the 53-year history of the LTIAA, has served as a member of the Board of Directors for the past two years.

STEPHEN T ORR, Vice President of Wyandotte Chemicals Corporation and for twenty-five years in charge of the Company's manufacturing and operating activities, has been made a member of the president's staff with the rank of Vice President, according to a recent announcement by Robert B Semple, President.

He is succeeded in his manufacturing responsibilities by FRANK WOLCOTT, his immediate assistant, who becomes General Manager of Manufacturing, Michigan Alkali Division.

Mr Orr, who joined Michigan Alkali in 1906 when he was graduated from Michigan State College, succeeded his father, William T Orr, as general manager on Oct 1, 1927, upon appointment by J B Ford, president of what was then Michigan Alkali Company.

Mr Wolcott joined Wyandotte two years ago as general manufacturing manager, having come to Wyandotte from the New Jersey Zinc Company.

In his new capacity in charge of Michigan Alkali Division operations, he will report to Mr Semple and will directly supervise the North, South, Kreelon and Glycol plants, in Wyandotte; the Calvert, Kansas and Blue Mountain, Mississippi plants; the Alpena Quarries, and the steamship and coal mining subsidiaries of the company.

Boyce C Bond

(Mr Bond was recently named sales supervisor for the Pittsburgh Coke and Chemical Company's newly-formed Fine Chemicals Division, in which capacity he will serve the textile trade in both a technical and sales capacity. His office is at Kenilworth Rd, Villanova, Pa.)

J A Doyle

JAMES A DOYLE, formerly editor of *Hosiery Industry Weekly*, has been named Promotion Manager for three publications of the Howes Publishing Company, New York, N Y. Mr Doyle will head up all promotional activities for *American Dyestuff Reporter*, *Hosiery Industry Weekly* and *Hosiery Merchandising*.

RECENT appointments to the Research and Development staff of The Chemstrand Corporation at Decatur, Alabama, include CARLYLE J STEHMAN (organic process group leader), WILLIAM T DYE, JR, ARTHUR B BEINDORFF, JAMES W STOOPS, HOWARD A CHAMBERLAIN, GARNETT L WADE, JR, and DANIEL L WORTH.

Dr Stehman, Dr Dye, Mr Stoops and Mr Chamberlain were previously engaged in fiber research at Chemstrand's Dayton laboratory. Mr Worth formerly was engaged as research chemist with Penick and Ford, Ltd, and most recently as a textile chemist with Mooresville Mills, Inc.

L M Miller

LM MILLER was recently appointed Market Development Manager for the Armour Chemical Division. He has long been associated with the textile industry having worked with Cluett Peabody's Sanforized Division and National Starch Products before joining Armour and Company in 1951.

JOHN HOLMES, vice president, Celanese Corp of America, has been named special assistant to K C LOUGHLIN, vice president and general sales manager, Textile Division.

At the same time, J C COOK was named sales manager for knitted fabrics in the same Division.

Mr Holmes and Mr Cook have been actively representing Celanese Corporation in the merchandising and development of knitted fabrics for twenty-five years.

OBITUARY

LINCOLN M SHAFER

LINCOLN M SHAFER, 57, production manager for Joseph Turner & Co of Ridgefield, N J, died on September 6th in Mountainside Hospital after an illness of one week.

Born in Brooklyn, N Y, Mr Shafer later moved to New Brunswick, N J, and in recent years was a resident of Upper Montclair, N J.

Upon his graduation from Pratt Institute, he worked for E I du Pont de Nemours & Co, Inc, and Monsanto Chemical Company until 12 years ago, when he organized and headed the Phoenix Color and Chemical Co. Phoenix was ultimately sold to the Interchemical Corporation. Three years ago, Mr Shafer formed the Rossville Dyestuff Corporation, Staten Island, N Y.

Surviving are his wife and two daughters.

NEW PRODUCTS AND DEVELOPMENTS

• Celanese Announces New Color-Pigmented Thick-and-Thin Acetate Yarn

Celanese Corporation of America has introduced a new development in its recently announced "Celaperm" family of color-pigmented fibers, presenting for the first time, color-fast thick-and-thin acetate yarns.

The new color-fast thick-and-thin fiber not only meets the timely fashion demand for fabrics with distinctive textural effects, but offers the important new advantage of color-fast properties, it is stated.

With the present emphasis on slubbed, nubby and shantung effects spotlighted throughout the entire textile field, "Celaperm" thick-and-thin colorfast yarn is expected to meet requirements for enlarging the textural possibilities in home decoration and apparel fabrics.

"Celaperm" yarns have been tested for color fastness to home laundering, dry cleaning, bleeding and crocking, perspiration and salt water, sunlight and gas fading.

• Arigen Pastes for Fast-Color Printing

Arigen ® Pastes, stabilized azoic dyes in emulsion form, have been introduced by Interchemical Corporation, Textile Colors Division, Hawthorne, N J, for the fast-color printing of cotton, spun rayon, and other fabrics.

Although Arigen Pastes were developed specifically for use in printing by Interchemical's exclusive Aquadye ® Emulsion system, they are said to be equally suitable for use in conjunction with conventional gum thickeners.

Among the advantages cited for Arigen Pastes when applied by the Aquadye Emulsion system are sharper marks, smoother blotches, better hand, and greater ease of application. Because no starches or gums are present in the emulsion, this system is claimed to be particularly valuable for printing flannels, suedes, and sheers. Arigen Pastes are also recommended by Interchemical for printing draperies, upholstery fabrics, tablecloths, handkerchiefs, dress goods, and other materials.

Arigen Pastes reportedly approximate one-fifth the strength of the corresponding Arigen Powders. They produce prints of the same depth, shade, and fastness properties as are obtained with the corresponding Arigen Single Solutions, it is stated.

• Emery Announces New Vegetable Fatty Acids

The addition of new products and the improvement of others now completes a wide selection of Vegetable-Type Fatty Acids as produced by Emery Industries, Inc.

Of particular interest to alkyd resins manufacturers is the improved quality of Emery 600 Distilled Cottonseed-Type Fatty Acid and Emery 610 Distilled Soya Type Fatty Acid with respect to lighter colors and better overall uniformity.

Also of considerable interest are two new tailor-made soya-type fatty acids, Emery 614 Distilled Soya Type-Alkyd Grade, and Emery 618 Distilled Soya Type-Super Alkyd Grade, both of which are said to offer color and iodine value advantages.

These fatty acids, plus Emery 622 Double Distilled Coconut Type, Emery 630 Distilled Corn Type, and Emersol 9305, 9310, 9315 Double Distilled Liquid Vegetable Type Fatty Acids, offer a complete selection of fatty acids for alkyd resins.

For other uses, the above fatty acids plus Emery 640 Distilled Palm Type and Emery 621 Distilled Coconut Type Fatty Acids, are said to provide a wide selection of highest-quality vegetable type fatty acids.

For complete specifications and compositions of these Emery Vegetable Type Fatty Acids, write to: Emery Industries, Inc, Dept 5, Carew Tower, Cincinnati 2, Ohio.

• Unique pH Testing Paper

A new and unique pH testing paper is currently being introduced to the trade by the J Einstein Company, Forest Hills 75, N Y, under the trade-name "Oxy-Phen".

Both indicator and comparative test colors, with the pH number printed above each color bar, are on the same strip.

To ascertain pH value, the entire strip is immersed in the solution for about 5 seconds so as to cover all the colors, superfluous fluid is shaken off and the color of the wet indicator matched with the wet comparison colors. pH value is read directly.

The colors are said to be stable to light and laboratory atmospheric conditions. A patented coating on the strips prevents diffusion of the colors.

OxyPhen is recommended by the manufacturer for peroxide bleaching baths of any concentration, but not for other strong oxidizing or reducing solutions.

• Lektrostat C, Antistatic Agent

A new antistatic agent with cationic characteristics for use on acetate, rayon, nylon and the new synthetic fibers has been announced by Dexter Chemical Corporation, New York. The company reports this agent, Lektrostat C, resists dry cleaning and washing to a moderate degree. It is being used for fabrics made of the new synthetics to improve cutting and "laying up" properties of the finished fabrics. Garments and other articles made from these treated fabrics are reported to have a better appearance and hand, and are said to resist soiling due to electrostatic attraction of dirt and dust. Lektrostat C also has been used to effectively combat static during spinning, slashing and weaving of synthetics, it is reported.

Generally, Dexter claims, 1 to 3% of Lektrostat on the weight of the goods is sufficient. The goods are run in a dye beck in the Lektrostatic solution for 15 to 30 minutes at 120°-130°F or padded through the solution. It is said to be compatible with resin mixes and with copper after-treatments as well as with starch, dextrines, gums and similar substances. It reportedly dissolves in hot water, is soluble in neutral, acid and alkaline solutions and is unaffected by hard water.

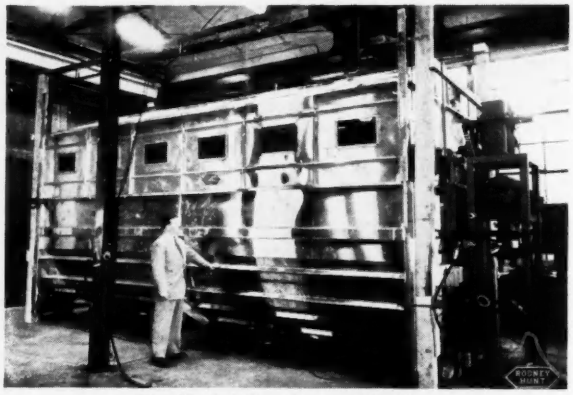
• Silver Lube R L

The Carolina Aniline & Extract Company, Charlotte 1, N C, has announced that Silver Lube R L, their recently-developed 50% nonionic micro-crystalline wax emulsion, is now out of the pilot stage.

The new product, which has a pH of 6, may be used as a fiber lubricant and added to the resin bath. Depending upon further mechanical procedure, it will also give smoothness to fabric and furnish lubrication to friction and schreiner calender rolls, it is claimed.

CA&E points out that, after the cloth is cured, a more flexible fabric is produced with increased wrinkle resistance and superior sewability because of the lubricants that have become an inherent part of the cloth due to the binder resin. They further point out that the Silver Lube RL that is tied in the cloth with the resin will not leach on washing.

In recommending that 1-3% of Silver Lube R L be used based on the weight of the total mix, the manufacturer cites the product's compatibility with gums, starches, urea- and melamine-formaldehyde resins, polyvinyl alcohol and acetate coatings.



Tru-Shade* Rug Dyeing Machine

• Dyeing Machines for Cotton Rug and Carpet Fabrics

The Rodney Hunt Machine Co, Orange, Mass, recently announced a new line of Tru-Shade* Dyeing Machines for the dyeing of cotton rug and carpet fabrics. These machines are said to have been thoroughly tested in the field over the past three years and are reportedly proving highly successful for the dyeing of wide cotton rug fabrics up to 19′ in full width in the piece. Company officials explain that Rodney Hunt's experience in constructing some of the largest dye kettles ever built in this country has been invaluable in the engineering of these machines, the tubs of which must be quite deep and of considerable front to back distance. (Machines in the field range from 6′ to 20′ width). Tubs of 14′ or over are supported in the center with a structural steel cradle. The stainless steel tub construction features heavily ribbed sides and the patented Curve-of-Strength* front which, it is reported, has proved more than adequate to support the great weight of water necessary in these machines. As an example, it is pointed out that in a 20′ machine, over 6,000 gallons of water will be used with a total weight of about 25 tons.

Officials claim that Rodney Hunt's years of experience in the construction of reels for dye kettles have been an advantage in the making of patented pipe body reels which will easily support these extremely heavy fabrics.

A variety of spreading and centering devices has been supplied to meet customer's individual requirements. Adjustable front to back partitions allow several different widths of fabric to be dyed in the same machine, thus avoiding the necessity of the purchase of several machines to accommodate different widths.

Although direct colors are chiefly employed for the dyeing of cotton rug fabrics in these machines, it is reported that some successful work has been done employing vat colors. However, it would appear that further experimental work is necessary before vat color applications can be called a complete success, according to Company officials.

* Registered trade mark

• Improved Heat Sealing Compounds

Heat sealing compounds, in addition to possessing good sealing properties, frequently must meet other severe specifications. Acrawax C, a high melting point synthetic wax (140°-143°C to 284°-290°F) is said to raise the melting and cold flow points of such compositions without reducing adhesion and cohesion at low temperatures. Water, salt spray and chemical resistance are also increased, it is claimed.

A formulation for such heat sealing compounds is available, having a high melting point (cold flow, 210°F min) and a resistance to cracking or flaking at minus 45°F. The compound is said to be noncorrosive and to form an efficient sealing barrier against leakage of air and moisture. It is also reported to be resistant to water and salt spray.

Particularly useful for sealing lenses in optical instruments and other glass units, Acrawax C is also adaptable to a wide range of other sealing applications where these properties are important. The formulation is available from the manufacturer, Glyco Products Co, Inc, 26 Court St, Brooklyn 2, N Y.

• New Plasticizer Promises Market for Agricultural Fats and Oils

A new class of vinyl plasticizers, epoxy fatty acid esters, were recently described by Frank P Greenspan of the Buffalo Electro-Chemical Co, Inc, before the American Chemical Society.

The new vinyl stabilizers are said to have an intrinsic stabilizing action, which minimizes resin degradation due to light and heat and makes the addition of stabilizing agents unnecessary.

The new product is based on fats and oils obtained from agricultural products.

• Harto-Resin R

Hart Products Corp, 1440 Broadway, New York, N Y, has introduced Harto-Resin R, a noncuring resin that provides an interesting range of hands on synthetic fabrics, especially acetates. It is recommended by the manufacturer for finishing foulards, jacquards, ninons, satins and taffetas. Harto-Resin R reportedly imparts a stiff lustrous finish to ribbon material of acetate, rayon and mixtures. It is pointed out that this resin locks the fiber and prevents unravelling upon cutting of the ribbon material.

A new water-white type phthalate-base resin which reportedly will not cause mark-offs or dull effects, Harto-Resin R is of low viscosity when diluted for thorough penetration of the fabric.

• Glycolonitrile Now Available in Commercial Quantities

Rohm and Haas Company has announced the commercial availability of glycolonitrile—a clear, colorless to light yellow liquid. Glycolonitrile is furnished as a 70% aqueous solution from which the anhydrous material can be obtained by distillation under vacuum. The boiling point of anhydrous glycolonitrile is 183°C at 759 mm.

This newest member of the Rohm and Haas family of cyanohydrins will reportedly undergo esterification, ether formation, reductive methylation, hydrolysis, simultaneous dehydration and hydrolysis, and other reactions—generally with excellent yields. Glycolonitrile offers a convenient method of cyanomethylation with a single reagent in place of the mixture of formaldehyde and hydrogen cyanide.

Glycolonitrile has been used as a solvent for polyacrylonitrile while its derivatives have been used as sequestering agents, gas absorbents, insecticides, pharmaceuticals, and resin intermediates. Glycine, a derivative of glycolonitrile, has been used as a component for dentifrices, for neutralizing artificial tanning materials, as a dyestuff intermediate, and as an ingredient of animal feeds. The reaction of glycinamide and formaldehyde reportedly yields resins which are useful in the stabilization of textiles and the preparation of molded and laminated articles.

Technical literature and experimental samples may be obtained by writing the Special Products Department, Rohm and Haas Company, Washington Square, Philadelphia 5, Pa.